THE IRON AGE

Established 1855 | New York, February 23, 1911 | Vol. 87: No. 8

Published Every Thursday by the
DAVID WILLIAMS COMPANY
14-18 Park Place, New York

Entered at the New York Post Office as Second Class Mail Matter.

Subscription Price, United States and Mexico, $5.00 per Annum; to Canada, $7.50 per Annum; to Other Foreign Countries, $10.00 per Annum. Single Copies, 20 Cents.

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Shipments and New Orders Increase

More Rail Buying at Home and for Export

A Firmer Billet Market—Pig Iron Stronger in All Districts

The developments of the past week support the view that the buying movement in finished material which started in mid-January is not a mere rebound from the extremely restricted buying of the closing weeks of 1910. The rate at which new orders have been taken this month by the Steel Corporation is considerably greater than that of January. The leading Pittsburgh interest sold 200,000 tons of billets, sheet bars, rails and steel ties this month up to the 18th, against 100,000 tons in the first 18 days of January. At the same time shipments by all steel manufacturers have increased probably 20 per cent., with the larger scale of mill operations in every line.

Railroads are better buyers than is currently credited. The principal rail order of the week is 40,000 tons for the Chicago & Northwestern. Export rail business shows no signs of lessening. The Buenos Aires & Pacific, in Argentina, has just closed for 15,000 tons of 70-lb. rails, and the Manila Railways are in the market for 10,000 tons. It is probable a portion at least of the 65,000 tons the Canadian Pacific is to buy will come to this country, as one Canadian steel mill will be kept busy most of the year on work already booked for the railroads. Buying of track supplies has been excellent. The Lake Shore has closed for 24,000 kegs of spikes and 5000 kegs of track bolts.

The lighter finished lines continue to lead in activity. Wire and tin plate mills are running to 90 per cent. of capacity. The hardship of the sheet industry in December is indicated by a 65 per cent. operation of the sheet mills of the Steel Corporation now against 40 per cent. at low point.

In wrought pipe demand has steadily grown and some good line contracts are expected from present plans for spring work. The Riverside pipe works of the leading interest at Wheeling are to be started up with the connected steel plant and two blast furnaces. The last full operation at this plant was in 1907.

Sharp competition is reported in bar iron in the Chicago district and considerable business was done at 1.25c., though 1.30c. is now the general minimum.

Cast iron pipe, usually a criterion of influences operating broadly in the iron market, has been quite active, and a large tonnage is pending for municipalities and corporations. The leading maker took a 5000-ton contract at Chicago of 6 to 12 in. pipe. Milwaukee is in the market for 10,000 tons.

A Canadian steel company which bought 15,000 tons of open hearth billets from the Gary mill in January has taken an additional 10,000 tons. At a Pittsburgh meeting of 20 billet and sheet bar makers February 17 an advance was favored by some companies,

but no action was taken. One large interest is limiting sales at present prices to the first quarter. Sales of 3000 tons of Bessemer and 1000 tons of open hearth sheet bars are reported at $24, Pittsburgh.

The pig iron market is firmer, particularly in the Central West. Stocks of steel making iron there are large, but are in strong hands, and instead of coming out on realizing sales, as has been the case for a good many months, are now evidently being held for the higher prices which are expected later in the year. Sales of 35,000 to 40,000 tons of basic are reported at Pittsburgh, much of it at $13.75. Cincinnati reports a sale of 10,000 tons of basic and one of 15,000 tons, deliveries running through the third quarter. Some of this iron may be included in the Pittsburgh transactions.

At a meeting of merchant furnace companies at Cleveland, February 17, the outlook was reported more favorable, particularly in basic iron, for which a number of Valley furnaces are now asking $14.

More buyers of foundry iron are in the market for their requirements for the second half. For that delivery furnaces are asking 50c. advance. A few sales of Southern No. 2 iron are reported at $11.50, Birmingham, for the third quarter, and the whole Southern situation has stiffened. Shipments from Alabama this month are reported in excess of output.

The advance in the scrap market, particularly in heavy melting steel, shows signs of too rapid a pace. At Pittsburgh heavy steel scrap has gone to $14.75, or $1 to $1.25 advance in two weeks. Some consumers appear to have over-stayed their market, and there has been active speculative buying by dealers.

Owing to Washington's Birthday falling on Wednesday of this week, this issue of *The Iron Age* is put to press on Tuesday. Hence all our market reports are dated a day earlier than usual.

1910 an Unusual Year in Rails

The statistics of rail production in the United States in 1910 are a surprise. They show that the total was 3,634,029 tons, or next to the highest year, 1906, whereas the general estimate, based on the disappointing business of some of the mills, was that the year's output would be considerably nearer 3,000,000 than 4,000,000 tons. The United States Steel Corporation, it was known, made a new record, at more than 2,000,000 tons, but that was attributed to the first full year of the new Gary mill and to the fact that the Ensley mill, owing to the depressed conditions in 1908 and 1909, had its first fair chance last year to make a good output under Steel Corporation ownership. It was believed that to most of the independent mills 1910 brought a very considerable falling off from their best records. The figures indicate that they fared very well.

A total of 3,634,029 tons of rails last year, against 3,062,582 tons in 1909, 3,633,654 tons in 1907 and 3,977,877 tons in the banner rail year, 1906, suggests that the complaint made all through last year that the railroads were not buying had less foundation than was generally believed. The question will naturally be asked, in view of the official statistics, How far would 1910 have exceeded the record of 1906 had the railroads really been buying last year? We have here another confirmation of the opinion expressed all through 1910 that it was a year of excellent business in iron and steel, gauged by any standard except that of the new capacity which had been provided in advance of the country's need of it. A further suggestion of a rail product only second to that of 1906 is that if the railroads, with all the effort they made last year to reduce their rail purchases, were compelled to buy more than 3,600,000 tons (less exports of 350,000 tons and 220,000 tons of light rails), the next year of free railroad buying is quite certain to show a total in excess of the nearly 4,000,000 tons of 1906. However, the indications that 1911 will be such a year are not conclusive as yet.

The advance of the open hearth rail from an output of 252,704 tons in 1907 to 1,715,899 tons three years later indicates that some unfavorable experiences with open hearth rails in the beginning of their use did not change the opinion of railroad engineers that it must be increasingly depended upon, in view of the scarcity of low phosphorus ores. Bessemer rail plants will lengthen their lives by the use of ores permitting them to produce rails with 0.07 to 0.08 per cent. phosphorus, but the high carbon, low phosphorus open hearth rail will doubtless pass the Bessemer rail in tonnage this year, and by another year increase the gap materially. Thus far electric steel rails are a negligible quantity, as are also alloy steel rails containing nickel, chrome and manganese. Ferrotitanium rails, which, strictly, are not alloy rails, since little or no titanium is found in the steel, may continue to be a considerable factor, under the new specifications, and we shall expect the insistent demand for quality to result in an increased tonnage of rails containing chrome and nickel. One Eastern steel company, as is well known, makes rail steel from ores containing both these metals, but the content of chrome and nickel may not be such as to put these rails in the alloy class, any more than the rails containing 0.50 to 0.60 per cent. copper, which were made some years ago from Cornwall ores and gave such good results in service.

The Anti-Trust Cases

The interesting opinion is advanced by eminent lawyers that the United States Supreme Court, in deciding the anti-trust cases now before it, will provide an adequate rule of action that may go far toward putting an end to further litigation under the Sherman anti-trust law—that is, the court may be expected to interpret the law so that all engaged in business will know precisely what constitutes a violation of it. They will then be able to tell whether they are approaching the danger line in their methods or whether they may have gone past it.

The fact is pointed out that unless something of this kind is done the Supreme Court is likely to become clogged with litigation, as the Department of Justice is industrious in hunting up cases of alleged violations of the act. That the court is desirous of avoiding such a condition has been shown in its decisions in construing other laws having a wide application, which might have led to the bringing before it of numerous cases, each of which would have had to be specially considered and decided. By laying down a rule of action, such other cases were then headed off. This would seem to be an eminently practical thing to do

in the anti-trust litigation. Not only the courts but the business world would be benefited by a clear statement of what is to be considered restraint of trade under the Sherman law. It is not to be expected that the Sherman law will have its teeth drawn, but the situation will be greatly clarified if those who are conducting large operations are told where the line is definitely drawn between what is lawful and what is unlawful.

The Electric Furnace and Electrical Engineering

The rapid extension of the use of electricity in steel works has made the electrical engineer a much more important factor in the operating organization. But his new prominence grows out of his contribution to the solution of new rolling mill problems, particularly those connected with the use of powerful motors for the driving of rolls. What is happening there is well indicated by the fact that the United States Steel Corporation, which at the beginning of 1907 had 100,000 hp. in gas engines supplied with blast furnace gas, now has 250,000 hp. in gas engines built and building. An important part of this increase is that devoted to the generation of electricity for the driving of rolling mill rolls and tables and the operation of cranes and other rolling mill equipment. It has been common, in commenting on the new place to which the electrical engineer has been raised in consequence of these developments, to link up with them the increasing employment of the electric furnace in the production of steel. It is to be doubted if the further development of the electric furnace will add greatly to the prominence of the electrical engineer as a steel works factor. It is the metallurgical side of electric furnace practice in which engineering skill will find its largest field. Electrode problems, which presented the greatest difficulties of all that were encountered early in American experience with the electric furnace, have now been satisfactorily solved. They were worked out, as were other problems, independent of the electrical engineer.

In the case of one type of furnace a quarter of a million dollars has been spent on experimental work under American steel works auspices. The result has been a degree of uniformity and reliability in furnace detail that makes it possible for an operator familiar with crucible or open hearth practice to become fairly proficient in electric furnace work after a few weeks' experience. The use of electricity for the development of heat is no more reason for the employment of the electrical engineer as a controlling factor in electric steel making than is the use of gas in the open hearth furnace a reason for considering the gas engineer indispensable to an open hearth steel works organization. In fact, it will doubtless come to pass that the greater elimination of variables and the uniform and dependable character of all the factors entering into furnace construction and operation will in time be added to the other advantages claimed for the electric furnace.

The Cast Iron Car Wheel and the Grinding Machine

Manufacturers of cast iron car wheels are availing themselves more and more of the grinding machine, in the belief that its work will greatly assist in maintaining for their product its present prominence in railroad equipment. Formerly the car wheel manufacturer was compelled to rely upon the accuracy of his foundry work. The chilled wheel does not yield to steel cutting tools. The casting had to be round as it came from the mold. Wonderful accuracy was obtained in the foundry, but naturally only an approximately true cylinder was created. Once a flat spot developed, the wheel ceased to be useful. Its competitor, the steel wheel, can be machined before using, and, also, it can be trued in a lathe at the will of its owner. Since the development of the use of grinding machines for the work, a chilled cast iron wheel can be made round, either on or off the axle. With a cylinder that is true within very narrow limits, the tendency to flat spots is greatly reduced, according to the extended tests of one of the great railroads. The grinding machine builders have solved the various problems most satisfactorily, and apparently have given the chilled cast iron wheel an extension of its career of usefulness.

Standard Lengths for Wire Test Pieces

The suggestion is made that the Bureau of Standards of the Department of Commerce and Labor should take up the question of standard lengths of test pieces of wire, possibly in connection with the task of establishing a standard gauge, which is now in progress The experience of testing departments is that the longer the test piece the lower the percentage of elongation, so that where very short pieces are used the manufacturer has a certain advantage in competition, his wire showing a greater strength for the same grade. Users of wire are apt to presume that the percentage of elongation must be constant, no matter whether a 2-in. or a 10-in. section be used in the testing machine. Practical experience, however, has demonstrated that in a large proportion of cases the wire develops its one weaker point where much of the recorded elongation takes place. Consequently, under these conditions, the stretch in a long piece bears a lower percentage to the full length than in a short piece. Other elements may enter into the question. Tests from adjacent sections of the same piece of wire demonstrate the truth of the conditions as stated. Therefore, the adoption of a standard length would produce for the buyer a more reliable knowledge of the material.

New Work for the Efficiency Engineer

The rapid development of the efficiency engineer idea is constantly bringing out some new work for that interesting specialist. A large automobile manufacturing company is now using an efficiency man in connection with its purchasing department. He spends much of his time visiting plants of machine tool manufacturers and examining their newest types of machines. He experiments with the equipment in turning out various automobile parts, and when he finds a machine that will reduce the production cost in any automobile manufacturing department he recommends its purchase. Of course, a visitor of this type is warmly welcomed, and is afforded all the help possible in developing new uses for the machine tools. There are many clever machine tool salesmen who make a practice of entering the shops of their customers and showing them how to get added use out of their mechanical equipment, but for a customer to search out

new uses for machine tool equipment and practically assist in development work is a novel idea.

The Dual Usefulness of the Mill Nurse

A great manufacturing plant employing some 1500 people has found the mill nurse a profitable investment, apart from the immediate care of the injured and sick among the employees. A woman, thoroughly trained in her profession, spends her time in the care of the families of employees as well as of the operatives themselves, and keeps in close touch with the life of the people. Her duties resemble those of the district nurse of the cities. In common with many other large manufacturing works of the country, a large percentage of the labor employed in the plant referred to consists of foreigners, many of them with scant knowledge of the English tongue and even less of American customs. Superintendents and foremen find difficulty in getting at intimate facts concerning the personnel of the working force; but the nurse, chosen for her tact as well as skill, eventually becomes more or less a confidante of the women in the homes. Her influence upon them is transmitted to the working members of the families. Their causes of complaint, the reasons for discontent, are learned from the tenements, making it much easier to avoid friction in the works. The influence of the women thus goes toward the prevention of clashes.

New Publications

Popular Handbook for Cement and Concrete Users. By Myron H. Lewis and Albert H. Chandler. Bound in cloth. Size, 6 x 9 in.; 500 pages; 126 illustrations. Price, $2.50. Published by the Norman W. Henley Publishing Company, 132 Nassau street, New York City.

This book is a concise semipopular treatise of the principles and methods employed in all classes of modern concrete work. It is not intended to compete with the highly technical publications, which are generally too involved and high priced for the nontechnical reader or average user of cement and concrete. The author has, however, brought together in this work all the salient matter of interest to users of concrete and its many diversified products. A lucid explanation of and a clear insight into the fundamental principles employed in concrete design and construction, free from involved mathematics and academic discussions of points not as yet settled in practice, is given.

After a brief introductory chapter, the author describes the kinds of cement and how they are made. This is followed by a discussion of concrete and its properties, and the selection, proportioning and mixing of the materials entering into it. The architectural possibilities of concrete are next taken up, followed by a number of chapters on the use of reinforced concrete for buildings, foundations, retaining walls, bridges and dams. Space is also given to sidewalks and the use of concrete in railroad work and on the farm. The waterproofing of concrete structures is discussed and the duties of a concrete inspector defined. The final chapter is devoted to the cost of concrete work and contains data not only on the cost of the various materials but also on actual contracts. Thirty-five tables scattered throughout the volume give useful information on various branches of concrete work.

Industrial Plants: Their Arrangement and Construction. By Charles Day. Cloth bound; pages 294, 5 x 7½ in. Illustrations, 48. Published by the *Engineering Magazine*, New York. Price, $3.

The author, who as a member of a firm of consulting engineers has had much to do with the design and construction of manufacturing plants, prepared a good part of this work for publication originally in the *Engineering Magazine*. The first eight out of twelve chapters are founded on lectures delivered before the Graduates' School of Business Administration, Harvard University, and the engineering students at Columbia University. They deal broadly with problems connected with the arranging and planning of industrial plants. The selection of the site and definition of building and equipment features are taken up in one chapter. Another is devoted to detailed plans and specifications, and a third to construction work and installation of equipment. Routing as a prime factor in layout is given a chapter. An axle factory is taken as a specific example, and a detail routing diagram is given, with details of machine tool equipment and paths of parts. In chapter VIII the author considers metal working plants from the standpoints of materials, equipment, buildings, labor and administration. Plants of this character are considered under three heads: First, those doing manufacturing work, as sewing machines, cash registers or typewriters; second, those making a definite line of comparatively heavy machine work, as machine tools, steam engines or locomotives; third, those doing general machine work, including miscellaneous, repair and jobbing work. The chapter following deals with machine shops and their specific requirements. Then comes a chapter on "Modern Industrial Plants," in which the features of several typical plants are described with illustrations, and finally there are two chapters dealing with the relationship of client and industrial engineer. One of these emphasizes the value of an outside engineering organization to the building project and the other discusses the question of compensation for engineering service.

The author's broad experience with the methods which modern industrial conditions have brought into play give him abundant material for such a work, and he has put it in a form calculated to be of the best service to his readers.

The Inland Steel Company Will Build Another Blast Furnace

Plans have been completed by the Inland Steel Company, Chicago, for the erection of a second blast furnace at its Indiana Harbor Works, Indiana Harbor, Ind., with a daily capacity of 450 to 500 tons. Contracts for the preliminary work have been let and construction will be pushed with all speed. The Great Lakes Dredge & Dock Company, Chicago, was awarded the contract for the piling, and John Mohr & Son, Chicago, the contract for the plate work and the erection of the stoves. The Allis-Chalmers Company, Milwaukee, secured the contract for the three blowing engines and the generator engine. The contract for the generators went to the General Electric Company. The Babcock & Wilcox Company secured the contract for eight Sterling boilers of 500 hp. capacity each. The completion of this furnace, which, it is expected, will be in the latter part of this year, will give the company a monthly output of 13,000 tons of pig iron.

The Inland Steel Company is also preparing plans for the addition of a department for the manufacture of rivets, track bolts, spikes and nuts in the larger sizes. This department will have a daily output of 100 tons of these products. On March 2 the stockholders of the company will meet to vote on the proposed increase in the capital stock of $1,500,000, part of which will be used to defray the cost of these improvements.

The Davis-Bournonville Company, West Street Building, New York City, is issuing a house organ, *Autogenous Welding*, the first issue of which has just appeared. Its purpose, as stated editorially, is to spread information requisite to the rapid progress of the oxy-acetylene process of welding and cutting metal. In addition to descriptions and illustrations of interesting apparatus the journal hopes to prove a valuable medium for exchange of ideas between expert operators, dealers and others who are interested.

The lake freight boat that is being built at the Lorain yard of the American Shipbuilding Company for M. A. Hanna & Co., Cleveland, Ohio., will be named Quincy M. Shaw, in honor of the president of the Calumet & Hecla Mining Company.

Steel Rail Production in 1910

Only Exceeded by the Record of 1906

The American Iron and Steel Association's statistics published this week show that the production of all kinds of rails in the United States in 1910 amounted to 3,634,029 gross tons, against 3,023,845 tons in 1909, an increase of 610,184 tons, or over 20.1 per cent. Rails rolled from purchased blooms, crop ends, scrap and "seconds," and rerolled and renewed rails are included. In the following table the production of all kinds of rails in the years beginning with 1900 is given. The maximum was reached in 1906 at 3,977,887 tons:

	Bessemer.	Open hearth.	Iron.	Total.
Pennsylvania	591,502	395,230	....	986,732
Other States	1,326,398	1,320,669	230	2,647,297
Totals for 1910	1,917,900	1,715,899	230	3,634,029
Totals for 1909	1,767,171	1,256,674	....	3,023,845
Totals for 1908	1,349,153	571,791	71	1,921,015
Totals for 1907	3,380,025	252,704	925	3,633,654
Totals for 1906	3,791,459	186,413	15	3,977,887
Totals for 1905	3,192,347	183,264	318	3,375,929
Totals for 1904	2,137,957	145,883	871	2,284,711
Totals for 1903	2,946,756	45,054	667	2,992,477
Totals for 1902	2,935,392	6,029	6,512	2,947,933
Totals for 1901	2,870,816	2,093	1,730	2,874,639
Totals for 1900	2,383,654	1,333	695	2,385,682

Of the total production of steel rails in 1910, 3,460,943 tons was rolled from ingots made by the makers and 172,856 tons from purchased ingots or blooms, crop ends, "seconds," or renewed or rerolled rails.

Bessemer and Open Hearth Rails

The production of Bessemer steel rails in 1910 amounted to 1,917,900 tons, against 1,767,171 tons in 1909, an increase of 150,729 tons, or over 8.5 per cent. Of the total in 1910 1,829,954 tons was rolled by makers of domestic ingots and 87,946 tons by companies which did not operate Bessemer converters. Included in the total by makers of ingots is 68,497 tons of rerolled rails. The following table gives the total production by States from 1907 to 1910:

Bessemer rails.	1907.	1908.	1909.	1910
Pennsylvania	1,093,932	315,547	553,719	591,502
Other States	2,286,093	1,033,606	1,213,452	1,326,398
Totals	3,380,025	1,349,153	1,767,171	1,917,900

The production of open hearth steel rails in 1910 was 1,715,899 tons, against 1,256,674 tons in 1909. The increase in 1910 over 1909 was 459,225 tons, or more than 36.5 per cent., while the increase in 1909 over 1908 was 684,883 tons, or over 119 per cent. Almost all the open hearth rails in 1910 were rolled from basic steel, and virtually all were rolled by producers of open hearth ingots. Indiana was the largest maker of open hearth rails in 1910, followed by Pennsylvania, Alabama, Colorado, Ohio, Maryland, New York and California in the order named.

The production of iron rails in 1910 was 230 tons, all rolled in Illinois.

Light Rails and Heavy Sections

The following table gives the production of all kinds of rails in 1910, and 10 preceding years according to the weight of the rails per yard. Street and trolley rails are included:

Kinds of rails. Gross tons.	Under 45 lb.	45 lb. and less than 85.	85 lb. and over.	Total. Gross tons.
Bessemer rails	190,455	861,591	865,854	1,917,900
Open hearth rails	31,977	424,381	1,259,541	1,715,899
Iron rails	230	.....	.....	230
Totals for 1910	222,662	1,285,972	2,125,395	3,634,029
Totals for 1909	255,726	1,024,856	1,743,263	3,023,845
Totals for 1908	183,869	687,632	1,049,514	1,921,015
Totals for 1907	295,838	1,569,985	1,767,831	3,633,654
Totals for 1906	284,612	1,749,650	1,943,625	3,977,887
Totals for 1905	228,252	1,601,624	1,546,053	3,375,929
Totals for 1904	291,883	1,320,677	672,151	2,284,711
Totals for 1903	221,262	1,603,088	1,168,127	2,992,477
Totals for 1902	261,887	2,040,884	645,162	2,947,933
Totals for 1901	155,406	2,225,411	493,822	2,874,639
Totals for 1900	157,531	1,626,093	602,058	2,385,682

Included in the 3,633,799 tons of steel rails rolled in 1910 are 200,621 tons of so-called alloy steel rails, as follows: Ferrotitanium rails, 195,940 tons; electric rails, 4210 tons; manganese rails, 390 tons, and nickel, chrome and vanadium steel rails, 81 tons. Of the total 174,822 tons was rolled from Bessemer steel and 25,799 tons from open hearth steel. In 1909 the production of alloy steel rails was 50,724 tons. It is a question whether ferrotitanium rails should be included among alloy rails, as under the usual practice the titanium, which is added to the molten steel through a certain charge of ferrotitanium, goes into the slag, and ordinarily there is no intention of producing a titanium alloy steel.

Customs Decisions

Galvanized Steel Wire Rope

In overruling a protest filed by O. G. Hempstead & Son, the Board of United States General Appraisers has fixed the status of galvanized steel wire rope under the tariff act of 1909. Duty was assessed under the provisions of paragraph 135, at 35 per cent. ad valorem (the minimum rate for round iron or steel wire), plus 1 cent a pound for the finished article, plus 0.2 cent per pound additional for the galvanizing. The importers protested against this assessment, claiming that the ad valorem rate should be levied against the value of the wire, and not on the value of the rope, and that the 1 cent per pound additional for the finished article, and the 0.2 cent a pound additional for the galvanizing, should be based only on the weight of the wire used in the manufacture of the rope and not on the weight of the finished merchandise. In denying the contentions of the importers, General Appraiser Fischer says:

> The provisions of paragraph 135 of the present act correspond with the provisions in paragraph 137, tariff act of 1897. The change in the wording of the respective paragraphs would not require a different conclusion than that expressed in G. A. 4, 761, wherein the court passed upon a like contention arising under the previous act. Following the rule noted, and for the reasons therein stated, the assessment here in question is affirmed.

File Testing Machines

In overruling a protest filed by Tinius Olsen & Co., Philadelphia, the Board of United States General Appraisers decides that so-called file testing machines are not to be regarded under the terms of the 1909 tariff act as machine tools. The machines in controversy are not used in any of the processes to manufacture complete files, but are used after the files are finished, to test their durability and to determine whether they are up to the commercial standard required. Duty was assessed at the rate of 45 per cent. ad valorem under paragraph 199 of the new law which specifies "manufactures of metal." Assessment is claimed by the importer at only 30 per cent. under the provision in the law for "machine tools." General Appraiser Fischer, in his decision for the tribunal, says: "We do not regard a testing and indicating apparatus as a machine tool, and it certainly is not a tool in the sense required for an article to be so termed. If it were a machine tool, then a thermometer and a scale for weighing articles would have to be likewise so considered. The protest is overruled and the decision of the collector affirmed."

Silico-Spiegel

A protest by Frank Samuel, Philadelphia, involving merchandise described as "10 per cent. silico-spiegel," was decided unfavorably to the protestant, who alleged that duty should be taken at $2.50 per ton under paragraph 118, at the same rate as that applying to spiegeleisen. The collector assessed the product under paragraph 183 of the act of 1909, as "metals unwrought." In denying the claim, General Appraiser Fischer says that the merchandise is an unwrought metal, and appears to have been properly classified.

The blast furnace of the Delaware River Steel Company, Chester, Pa., was blown in February 19, and will operate on basic pig iron.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Feb.21, 1911.	Feb.15, 1911.	Jan.25, 1911.	Feb.23, 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	$15.50	$15.50	$15.50	$18.50
Foundry No. 2, Southern, Cincinnati	14.25	14.25	14.25	16.75
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	13.50
Foundry No. 2, local, Chicago	15.50	15.50	15.50	19.00
Basic, delivered, eastern Pa.	14.50	14.50	14.25	18.50
Basic, Valley furnace	13.75	13.75	13.25	16.00
Bessemer, Pittsburgh	15.90	15.90	15.90	18.90
Gray forge, Pittsburgh	14.40	14.40	14.15	16.90
Lake Superior charcoal, Chicago	17.50	17.50	17.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	23.00	23.00	23.00	27.50
Forging billets, Pittsburgh	28.00	28.00	28.00	32.00
Open hearth billets, Philadelphia	25.40	25.40	25.40	30.60
Wire rods, Pittsburgh	29.00	29.00	28.00	33.00
OLD MATERIAL, Per Gross Ton:				
Iron rails, Chicago	15.50	15.50	14.50	19.00
Iron rails, Philadelphia	**18.00**	17.50	17.00	20.00
Car wheels, Chicago	13.00	13.00	13.00	17.50
Car wheels, Philadelphia	**14.00**	13.50	13.00	16.75
Heavy steel scrap, Pittsburgh	**14.75**	14.50	13.50	16.75
Heavy steel scrap, Chicago	**12.50**	11.75	11.50	15.25
Heavy steel scrap, Philadelphia	**14.50**	14.00	12.50	16.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer steel rails, heavy, at mill	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia	**1.37½**	1.35	1.32½	1.60
Common iron bars, Chicago	1.30	1.30	1.30	1.60
Common iron bars, Pittsburgh	1.35	1.35	1.35	1.70
Steel bars, tidewater, New York	1.56	1.56	1.56	1.66
Steel bars, Pittsburgh	1.40	1.40	1.40	1.50
Tank plates, tidewater, New York	1.56	1.56	1.56	1.71
Tank plates, Pittsburgh	1.40	1.40	1.40	1.55
Beams, tidewater, New York	1.56	1.56	1.56	1.66
Beams, Pittsburgh	1.40	1.40	1.40	1.50
Angles, tidewater, New York	1.56	1.56	1.56	1.66
Angles, Pittsburgh	1.40	1.40	1.40	1.50
Skelp, grooved steel, Pittsburgh	1.30	1.30	1.25	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.30	1.60
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.40
Wire nails, Pittsburgh*	1.75	1.75	1.75	1.85
Cut nails, Pittsburgh	1.60	1.60	1.60	1.80
Barb wire, galv., Pittsburgh*	2.05	2.05	2.05	2.15
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	12.75	12.75	12.75	13.75
Electrolytic copper, New York	12.37½	12.37½	12.37½	13.37½
Spelter, New York	**5.60**	5.57½	5.55	5.70
Spelter, St. Louis	**5.45**	5.42½	5.40	5.55
Lead, New York	*4.42½*	4.45	4.50	4.55
Lead, St. Louis	*4.27½*	4.30	4.35	4.40
Tin, New York	*44.75*	45.75	43.25	33.20
Antimony, Hallett, New York	**8.00**	7.75	7.25	8.25
Tin plate, 100-lb. box, New York	$3.94	$3.94	$3.84	$3.84

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.40c. to 1.45c., net; I-beams over 15 in., 1.50c. to 1.55c., net; H-beams over 8 in., 1.55c. to 1.60c.; angles, 3 to 6 in, inclusive, ¼ in. and up, 1.40c. to 1.45c., net; angles over 6 in., 1.50c. to 1.55c., net; angles, 3 in., on one or both legs, less than ¼ in. thick, 1.45c., plus full extras as per steel bar card, effective September 1, 1909; tees, 3 in. and up, 1.45c., net; zees, 3 in. and up, 1.40c. to 1.45c., net; angles, channels and tees, under 3 in., 1.45c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.70c. to 1.75c., net; hand rail tees, 2.50c.; checkered and corrugated plates, 2.50c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.55c.; Nos. 9 and 10, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 1.85c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 1.95c.; Nos. 17 to 21, 2c.; Nos. 22, 23 and 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Three pass cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 2.05c.; Nos. 17 to 21, 2.10c.; Nos. 22 to 24, 2.15c.; Nos. 25 and 26, 2.20c.; No. 27, 2.25c.; No. 28, 2.30c.; No. 29, 2.35c.; No. 30, 2.45c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2.20c.; Nos. 12, 13 and 14, 2.30c.; Nos. 15, 16 and 17, 2.45c.; Nos. 18 to 22, 2.60c.; Nos. 23 and 24, 2.70c.; Nos. 25 and 26, 2.90c.; No. 27, 3.05c.; No. 28, 3.20c.; No. 29, 3.30c.; No. 30, 3.50c. Painted roofing sheets, No. 28, $1.55 per square. Galvanized sheets, No. 28, $2.75 per square for 2½-in. corrugations. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
Butt Weld.				
⅛, ¼, ⅜ in.	72	58	68	54
½ in.	75	63	71	59
¾ to 1½ in.	79	69	75	65
2 to 3 in.	80	70	76	66
Lap Weld.				
2 in.	76	66	72	62
2½ to 4 in.	78	68	74	64
4½ to 6 in.	77	67	73	63
7 to 12 in.	75	59	71	55
13 to 15 in.	51½	..	..	..
Butt Weld, extra strong, plain ends, card weights.				
¼, ⅜, ⅝ in.	69	59	65	55
½ in.	74	68	70	64
¾ to 1½ in.	78	72	74	68
2 to 3 in.	79	73	75	69
Lap Weld, extra strong, plain ends, card weight.				
2 in.	75	69	71	65
2½ to 4 in.	77	71	73	67
4½ to 6 in.	76	70	72	66
7 to 8 in.	69	59	65	55
9 to 12 in.	64	54	60	50
Butt Weld, double extra strong, plain ends, card weight.				
½ in.	64	58	60	54
¾ to 1½ in.	67	61	63	57
2 to 3 in.	69	63	65	59
Lap Weld, double extra strong, plain ends, card weight.				
2 in.	65	59	61	55
2½ to 4 in.	67	61	63	57
4½ to 6 in.	66	60	62	56
7 to 8 in.	59	49	55	45

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Plugged and Reamed.

1 to 1½, 2 to 3 in.	Butt Weld	Will be sold at two (2) points lower basing (higher price) than merchant or card weight pipe, Butt or Lap Weld as specified.
2, 2½ to 4 in.	Lap Weld	

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in.	49	43
1¾ to 2¼ in.	61	43
2½ in.	63	48
2¾ to 5 in.	69	55

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, $29.

Steel Rivets.—Structural rivets, ¾ in. and larger, 1.90c., base; cone head boiler rivets, ¾ in. and larger, 2c., base; ⅞ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill.

Pittsburgh

PARK BUILDING, February 21, 1911.—(*By Telegraph.*)

Pig Iron.—There has been quite an active movement in basic iron, and reports are that 35,000 to 40,000 tons have been sold by furnaces and dealers in the past week or 10 days, and at prices fully 50c. a ton higher than prevailed in this market a month ago. A local steel company has bought 10,000 tons for delivery over the next five or six months at a price said to have been $13.75 or under at Valley furnace. The minimum of the market on basic iron to-day is $13.75 and most furnaces are quoting $14, Valley furnace. A meeting of the merchant furnace interests was held at Cleveland, Ohio, February 17, and reports made there showed that the iron trade had improved considerably recently. There is no new demand for Bessemer iron, but furnaces are holding firm at $15, at furnace. A few small lots of Bessemer have been offered by dealers at about 10c. a ton under this price. We quote Bessemer pig iron, $15; malleable Bessemer, $13.75; basic, $13.75 to $14; No. 2 foundry, $13.75 to $14, and gray forge, $13.50, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel.—Conditions in the steel trade are more active than for some time and prices are very firm. We note sales of 2000 and 1000 tons of Bessemer sheet bars and 1000 tons of open hearth sheet bars, all at $24, Pittsburgh, for delivery prior to April 1. We quote Bessemer and open hearth billets, 4 x 4 in. and up to, but not including, 10 x 10 in., at $29, base, and sheet and tin bars in 30-ft. lengths, $24, f.o.b. Pittsburgh or Youngstown, full freight to destination added. We quote 1½-in. billets at $24 and forging billets at $28, base, usual extras for sizes and carbons, f.o.b. Pittsburgh or Youngstown districts, freight to destination added.

(*By Mail.*)

A meeting of the Billet and Sheet Bar Division of the American Iron and Steel Institute was held in Pittsburgh February 17, and was attended by about 20 of the large and small steel producers. Reports made by nearly all those present showed that the billet and sheet bar mills are busier now on actual orders than they have been for some months. Some of those present were in favor of making an advance in billets and sheet bars, but it was deemed unadvisable to do so at this time. It was stated, however, that recently, in one or two cases, slight premiums over regular prices had been paid for open hearth billets and sheet bars for spot delivery. None of the mills is disposed to sell steel at present prices for delivery beyond April 1. The Carnegie Steel Company is reported to be sold up on open hearth bars to April 1, and will not take any more orders for early delivery. Last week the steel plants of this company at Duquesne, Bellaire, Mingo Junction, Youngstown and New Castle were operated to full capacity for the first time in several months. The general situation is undoubtedly better. Up to January 18 the rail and billet sales department of the Carnegie Steel Company received actual orders sent to the mills for slightly over 100,000 tons of billets, sheet bars, rails and steel ties, while up to February 18 the actual orders it entered for these materials exceeded 200,000 tons. The National Tube Company is starting up this week its tube mill at Benwood, W. Va., and two blast furnaces that have been closed down for about a year. The Carnegie Steel Company is starting up this week its No. 3 blast furnace at South Sharon, while the plant of the Allegheny Steel Company at Brackenridge, Pa., is operating now to nearly full time. Prices are firm all along the line. There are reports of another $1 per ton advance in wire products to be made March 1, but not confirmed. The scrap market is very strong and prices on heavy steel scrap have again advanced. The feeling in coke is better.

Ferromanganese.—Some small inquiry is in the market, but prices are weak. A sale of about 50 tons is reported on the basis of about $37.50, Baltimore. We quote 80 per cent. foreign at $37.50 to $37.75, Baltimore, the freight rate to the Pittsburgh district being $1.95 a ton.

Ferrosilicon.—The leading local consumer that has been in the market for 6000 to 7000 tons of 50 per cent. for delivery over the remainder of this year has not yet closed. Another local consumer is figuring on the purchase of 300 tons of 50 per cent., for delivery up to July, and it will probably be sold on the basis of about $54, Pittsburgh. Some other small inquiry is in the market, but prices seem weak. We quote 50 per cent. at $54 to $54.50, f.o.b. Pittsburgh, for delivery up to July. We quote 10 per cent. blast furnace silicon at $23; 11 per cent., $24, and 12 per cent., $25, f.o.b. cars, Jisco and Ashland furnaces.

Muck Bar.—Strictly best grades of muck bar made from all pig iron are held at about $30, Pittsburgh, but on a firm offer this price might be shaded. No sales have been made here for some time.

Skelp.—The better feeling in steel billets and the firmness in prices are reflected in skelp, which is very strong. The two or three mills in this district that roll iron and steel skelp for the open market have more orders on their books than for some time. We quote grooved steel skelp at 1.30c., sheared steel skelp, 1.35c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.70c. to 1.75c., all for delivery at consumers' mills in the Pittsburgh district, usual terms.

Wire Rods.—The activity in the wire trade is shown in rods, new inquiry being better than for some time. A sale of 300 tons of open hearth rods for March shipment is reported at $29, Pittsburgh. The new rod mill of the Cambria Steel Company was started up last week and is working very successfully. It will sell the output in the open market until its wire nail and wire mills are finished, which will be in three or four months. We quote Bessemer, open hearth and chain rods, at $29, Pittsburgh.

Steel Rails.—No orders for standard sections have been placed in the past week for domestic roads, but the Carnegie Steel Company has booked good orders for export and is having an active demand for its mine section steel ties for use in railroad coal mines, which are giving good satisfaction. New orders for light rails are not as active as they were some time ago, the company having taken in the past week slightly less than 2000 tons. The mills rolling light rails are having strong competition from the rerolling rail mills. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25 lb., 1.21c. to 1.25c.; 30 and 35 lb., 1.20c., and 40 and 45 lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Plates.—The Pressed Steel Car Company has received an order from the Virginian Railway for 1000 steel hopper cars, and the plates and steel wheels will be furnished by the Carnegie Steel Company. The same car builder has an order from the Pittsburgh, Shawmut & Northern for 550 steel gondola cars, while the American Car & Foundry Company received a like order from the same road. The Lehigh & New England Railroad is reported to have placed an order for 500 steel hopper cars with the American Car & Foundry Company, and a like order with the Standard Steel Car Company. The order for 1000 steel cars for the Wabash-Pittsburgh Terminal Railroad is expected to be given out this week. Prices on plates are firm, and we quote ¼-in. and heavier plates at 1.40c., Pittsburgh.

Structural Material.—Local structural concerns report they are figuring on a very large amount of business, but that it is very slow to close; in fact, new orders for the past two or three weeks have been disappointing, and there is still much complaint about the low prices being made for erected work. Prices on plain material are reported firm,

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and we quote beams and channels up to 15 in. at 1.40c., Pittsburgh.

Tin Plate.—This is one of the most satisfactory departments of the whole iron trade, new demand being fairly active, with specifications coming in very freely. The Jones & Laughlin Steel Company has placed a contract with the Standard Engineering Company, Ellwood City, Pa., for the building of 12 more hot mills, which will give it a total of 24 at Aliquippa, Pa. The American Sheet & Tin Plate Company has started up some additional hot mills and is now operating to 87 per cent. of its hot mill capacity. The recent advance in prices is being held, and we quote 100 lb. cokes at $3.70 per base box, f.o.b. Pittsburgh.

Sheets.—Mills report a slow but steady improvement, the new demand showing a gradual increase, while specifications against contracts are coming in at a fairly satisfactory rate. The full schedule of prices in effect on the different grades of sheets, and which is printed on a previous page, is reported as being maintained.

Bars.—Bar iron prices seem to be firmer, due to the recent advances in scrap, and several local mills are now reported as adhering to the basis of 1.40c., Pittsburgh. The new demand for steel bars is light, but specifications against contracts are coming in quite well. Hard steel bars, used for concrete reinforcement, have been dull for some time, but a larger demand is expected soon, as the building season will open actively in a short time. We quote steel bars at 1.40c., and iron bars at 1.35c. to 1.40c., in carload and larger lots, f.o.b. Pittsburgh.

Hoops and Bands.—A fair amount of new business is being placed, but most large consumers of both hoops and bands made contracts some time ago, against which they are now specifying. The recent weakness in prices is reported to have disappeared, and it is stated that regular prices of 1.50c. on hoops and 1.40c. on bands are now being maintained.

Spikes.—The spike trade continues quiet, no large contracts having been placed with local makers for some time. Prices, as adopted February 1, are reported as being held, and are as follows:

Railroad Spikes.

4½, 5 and 5¼ x 9/16	$1.55
3, 3½, 4, 4½ and 5 x ½	Extra .10
3½, 4 and 4½ x 7/16	Extra .20
3, 3½, 4 and 4½ x ⅜	Extra .30
2½ x ⅜	Extra .40
2½, 3 and 3½ x 5/16	Extra .60
2 x 5/16	Extra .80

Boat Spikes.

¾ in. square, 12 to 24 in. long	Extra .15
⅝ in. square, 8 to 16 in. long	Extra .15
½ in. square, 6 to 16 in. long	Extra .15
7/16 in. square, 6 to 12 in. long	Extra .20
⅜ in. square, 4 to 12 in. long	Extra .30
5/16 in. square, 4 to 8 in. long	Extra .45
¼ in. square, 4 to 8 in. long	Extra .75
¼ in. square, 3 to 3½ in. long	Extra 1.00

⅜ and 5/16 shorter than 4 in., ¼ cent extra.

Spelter.—The market is decidedly firmer, and the demand is reported as much heavier. We quote prime grades of Western at 5.35c., East St. Louis, equal to 5.47½c., Pittsburgh.

Merchant Steel.—New orders are about as heavy as in the corresponding period in January, but shipments by the mills have been larger. Prices are reported as very firm, and we quote as follows, f.o.b. Pittsburgh: Iron finished tire, ½ x 1½ in. and heavier, 1.40c., base; under these sizes, 1.55c.; planished tire, 1.60c.; channel tire, 1.80c., base; toe calk, 1.90c.; flat sleigh shoe, 1.55c.; concave or convex, 1.75c.; cutter shoes, tapered or bent, 2.25c.; spring steel, 2c.; machinery steel, smooth finish, 1.90c.

Rivets.—Orders are mostly in small lots to cover actual needs, but specifications against contracts are reported as coming in more freely. Regular prices, which are 1.90c. on structural rivets and 2c. on boiler rivets, continue to be slightly shaded.

Wire Products.—The new demand for wire and wire nails is quite active and specifications against contracts are reported as coming in well. The two leading wire interests are reported as operating to practically full capacity, with more orders on their books than at any time in some months. We quote galvanized barb wire at $2.05, painted $1.75, annealed fence wire $1.55, galvanized $1.85, wire nails $1.75 and cut nails $1.60, in carload and larger lots, all f.o.b. Pittsburgh, full freight to point of delivery added.

Merchant Pipe.—It is reported that the Tri-State Natural Gas Company has placed a contract for 70 to 75 miles of 3 to 10-in. line pipe, but the name of the mill getting the order has not been given out. The National Tube Company is getting ready to start its Riverside tube mill at Benwood, W. Va., which has run only for a few months since 1907. Blast furnace B at this plant was started February 20; furnace A is scheduled to start February 23; the Bessemer steel department and blooming mill, to start March 6; the skelp mills on the same date, and the pipe mills March 7. This plant turns out pipe up to 6-in. in diameter. The general demand for merchant pipe is showing a gradual increase and the leading mills are working to fuller capacity than for some time. Some very important projects for gas and oil lines, involving a large tonnage of pipe, are under way.

Boiler Tubes.—This trade continues very unsatisfactory, both from the standpoint of prices, which are being materially shaded, and also from demand, which is still dull. It is understood that very low prices are being made on the small amount of business in both locomotive and merchant tubes that is being placed.

Coke.—There is a better feeling in the coke trade. Prices seem to be a trifle firmer. A sale is reported of about 1500 tons of standard grade blast furnace coke for prompt shipment on the basis of about $1.50, per net ton, at oven. The output in the Upper and Lower Connellsville regions last week is estimated at 323,333 net tons, an increase over the previous week of 21,058 tons. This gain in output was entirely at the blast furnace ovens, due to the starting up of a number of furnaces. We quote standard makes of furnace coke for spot shipment at $1.45 to $1.55 per net ton, at oven; on contracts for delivery over the year from $1.70 to $1.75 is being quoted by some coke operators, while others are firm, at $1.90 to $2, at oven. Best makes of 72-hour foundry coke are being held at $2.10 to dealers and from $2.25 up to $2.50, at oven, to consumers.

Iron and Steel Scrap.—There seems to be something of a runaway market in the scrap trade. Some dealers believe that the advance in prices has been too rapid, and that there will be a reaction. However, it is a fact that there is a scarcity in supply of heavy steel scrap and other grades as well, and dealers are afraid to sell material ahead that they do not have, as they may not be able to get it when needed. Reports are that heavy steel scrap has sold in large quantities in the past week as high as $15 at nearby consuming points. Consumers had allowed their stock to run down to a minimum, and are now eager buyers at prices they turned down only a few days ago. We have advanced quotations on nearly all grades of scrap. We note a sale of 500 tons of cast iron borings at $9.75 to a dealer; 5000 to 7000 tons of heavy steel scrap at $14.50 to $14.75, with several sales reported as high as $15; 2000 tons of cast iron borings at $9.75, delivered to consumers' mills in the Pittsburgh district, and 1500 to 2000 tons of turnings at $10.50, delivered to consumers' mills. A large steel company in the Youngstown district is reported to have sold a heavy tonnage of steel scrap at $14.50, f.o.b. cars, at its mill, the freight rate to the nearest consuming point being 45c. per ton. Dealers have advanced prices and now quote as follows per gross ton, f.o.b. Pittsburgh, or elsewhere as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$14.75 to $15.00
No. 1 foundry cast	14.50 to 14.75
No. 2 foundry cast	13.75 to 14.00
Bundled sheet scrap, at point of shipment	11.00 to 11.25
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	15.00 to 15.25
No. 1 railroad malleable stock	13.25 to 13.50
Grate bars	11.25 to 11.50
Low phosphorus melting stock	17.25 to 17.50
Iron car axles	24.75 to 25.00
Steel car axles	20.50 to 20.75
Locomotive axles	24.25 to 24.75
No. 1 busheling scrap	12.50 to 12.75
No. 2 busheling scrap	9.00 to 9.25
Old car wheels	13.75 to 14.00
Sheet bar crop ends	16.00 to 16.25
*Cast iron borings	9.50 to 9.75
*Machine shop turnings	10.25 to 10.50
Old iron rails	16.00 to 16.25
No. 1 wrought scrap	14.50 to 14.75
Heavy steel axle turnings	10.25 to 10.50
Stove plate	11.50 to 11.75

* These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Chicago

FISHER BUILDING, February 21, 1911.—(*By Telegraph.*)

Anticipating favorable Supreme Court decisions in the tobacco and oil cases, Western consumers are inquiring and buying more freely. This tendency is strengthened by recent liberal orders for pig iron from large melting interests and still further encouraged by the precipitation of moisture in dry sections of the Middle West and Northwest, where the need was beginning to cause some anxiety. Numerous inquiries call for pig iron prices as far ahead as the first quarter of 1912, but, stimulated by the same causes of optimism, producing interests are loath to consider business for delivery beyond the first half of this year, except at a sharp advance, and not at all for 1912 shipments. The open winter thus far

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prevailing has been decidedly favorable to outdoor operations and a very healthy demand exists for all kinds of structural and building material. Contracts continued to be placed for large tonnages of cast iron pipe, and specifications running well into six figures have been received by makers since the first of the year. Under the speculative influences at work in this market, scrap has moved upward rapidly in the last two weeks. The resumption of operations on Monday at the rail mills in the South Chicago and Gary plants followed the receipt of attractive shipping instructions for standard sections. The contracts for new construction let last week included a new blast furnace of 450 tons capacity for the Inland Steel Company, to be erected at Indiana Harbor, Ind. The same interest is also planning a further addition of a nut and bolt department to its plant, the contracts for which will be let in the near future.

Pig Iron.—Considerable interest has been manifested in pig metal since the announcement of heavy purchases by pipe and implement interests a week ago. Conspicuous among the inquiries are Western malleable foundries, whose combined requirements run into many thousands of tons. Quit a few of these concerns evince a disposition to contract for their wants to April, 1912, but are receiving no encouragement in this respect from furnaces. Nor are the latter willing to obligate themselves even for last half deliveries, except at sharp advances above present prices. The demand for Southern iron is quite as insistent as that for Northern brands. A great many scattering sales have been made, ranging from 100 tons upward. Furnaces are adhering strictly to the $11, Birmingham, basis for No. 2 for first half delivery. Some sales for the last half were made last week at this price, but it is not possible to duplicate them. Generally speaking, the schedule for July to December shipment is based on $11.50 for No. 2, though occasionally the inducement is offered to old customers to cover at $11.25 for the third quarter, and $11.50 for the fourth quarter. The market is stiffening daily and at least one large Southern producing interest is declining to quote on any business for the second half. The following quotations are for February and March shipments, Chicago delivery:

Lake Superior charcoal	$17.50 to $18.00
Northern coke foundry, No. 1	16.00 to 16.50
Northern coke foundry, No. 2	15.50 to 16.00
Northern coke foundry, No. 3	15.25 to 15.75
Northern Scotch, No. 1	16.50 to 17.00
Southern coke, No. 1	15.85 to 16.35
Southern coke, No. 2	15.35 to 15.85
Southern coke, No. 3	15.10 to 15.60
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	15.85 to 16.35
Southern coke, No. 2 soft	15.35 to 15.85
Southern gray forge	14.60 to 15.10
Southern mottled	14.60 to 15.10
Malleable Bessemer	15.50 to 16.00
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6%	17.90 to 18.40
Jackson Co. and Kentucky silvery, 8%	18.90 to 19.40
Jackson Co. and Kentucky silvery, 10%	19.90 to 20.40

Rails and Track Supplies.—Indicative of improved conditions in these products was the resumption on Monday of work in the rail mills at South Chicago and Gary after an idleness of nearly two weeks. New business in standard sections last week aggregated 5000 tons. A good demand for light rails continues to be felt. Track supplies are moving freely. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.15c. to 2.25c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c. Light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12-lb., 1.25c. to 1.29½c., Chicago.

Billets and Rods.—Intermediate steel products have stiffened in sympathy with other crude and semi-finished materials and the local mills are holding firm to the minimum of $30.60, base, Chicago, for open hearth forging billets. Specifications are good and there is some scattering inquiry for new tonnage. Wire rods are firmly held at $29, Pittsburgh.

Structural Material.—The open weather this month has decidedly aided the structural market. Building operations in the Chicago territory are unusually active for this time of the year. Warehouse stocks have felt this impetus, and there is an active movement from these in small lots. Mill conditions also have improved, due to the heavier specifications from fabricators and railroads, largely attributed to the same cause. Prices of plain material are very firm, but unchanged. The fabricating contracts let this week aggregate 3800 tons, divided as follows: Post-office at Missoula, Mont., 116 tons, let to the St. Paul Foundry Company; foundry building for Puget Sound Navy Yard, Bremerton, Wash., 800 tons, to the McClintic-Marshall Construction Company; First Presbyterian Church, San Francisco, Cal., 140 tons, to Pacific Rolling Mill Company; St. Ignatius Church, for the Jesuit Fathers, San Francisco, Cal., 800 tons, to Central Iron Works; Y. M. C. A. Building, Chicago, 270 tons, to A. Bolter's Sons, Chicago; wagon factory for the Anheuser Busch Brewing Association, St. Louis, Mo., 570 tons, to Noelke-Richards Iron Company, Indianapolis; coal handling plant for the C. Reiss Coal Company, Manitowoc, Wis., 440 tons, to Heyl & Patterson, Pittsburgh. Figures are being taken for an office building in St. Paul, which will require in the neighborhood of 2000 tons of shapes. We quote plain material from mill, 1.58c. to 1.63c., Chicago; from store, 1.80c. to 1.90c., Chicago.

Plates.—There is a fair volume of new business coming forward. Specifications continue good and mill order books are in excellent shape. A strong confidence is displayed as to the future trend of the market. We quote mill prices at 1.58c. to 1.63c., Chicago; store prices, 1.80c. to 1.90c., Chicago.

Sheets.—The most noteworthy feature of the market is the disposition to adhere more strictly to card prices. Galvanized sheets are moving freely as the season for their consumption advances, but black and corrugated sheets are enjoying only a normal demand. We quote Chicago prices, carload lots, from mill: No. 28 black sheets, 2.38c.; No. 28 galvanized, 3.38c.; No. 10 blue annealed, 1.83c. Prices from store, Chicago, are: No. 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 28 black, 2.75c. to 2.85c.; No. 28 galvanized, 3.65c. to 3.75c.

Merchant Steel.—Nothing of importance has developed in the week under review. A fair tonnage of new business has been closed and specifications are up to the average.

Cast Iron Pipe.—There is a very active demand for all sizes. The leading interest has secured contracts this week for 5000 tons of 6-in. to 12-in. pipe from the city of Chicago, and 1500 tons from Boone, Iowa. Milwaukee is in the market for 10,000 tons of 20-in., and possibly a large additional tonnage of smaller sizes. Indianapolis will let a contract February 24 for 1200 tons, and Rockford, Ill., will soon buy 500 tons. There is also pending a very large tonnage, made up of small lots for various municipalities in the States contiguous to this center. Prices are very firm. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $25.50; 6 to 12 in., $24.50; 16-in. and up, $24, with $1 extra for gas pipe.

Bars.—A very sluggish market prevails in iron and steel bars. Implement interests are slow in making new contracts for their requirement for the fiscal year soon to commence. Specifications against existing contracts also are reported below normal, though the mills appear not to be suffering for tonnage. Bar iron is sentimentally stronger as a result of the sharp advance in scrap, but mills have not been able as yet to advance their prices. The sharp competition among Western producers, in fact, has resulted in concessions on desirable business, and sales have been made in the past week at 1.25c. and 1.27½c. for 30 to 60 day deliveries; however, mills are now holding firm at prices from 50c. to $1 a ton above these prices. We quote as follows: Soft steel bars, 1.58c.; bar iron, 1.30c. to 1.35c.; hard steel bars rolled from old rails, 1.35c. to 1.40c., all Chicago. From store, soft steel bars, 1.80c. to 1.90c.

Wire Products.—Specifications from the hardware and implement trades are coming in rapidly, and somewhat earlier than expected. The sales of wire products were better in January than for the same period in the past three years, and February is rounding out considerably above normal. There is some talk of the possibility of an advance to take place in the near future, though prices remain firm as follows: Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.73c.; wire nails, 1.93c.; painted barb wire, 1.93c.; galvanized, 2.23c., all Chicago.

Old Material.—Speculators seem to have the local market well in hand. In the face of a light consumptive demand, they have succeeded in raising prices from 25c. to $1 a ton. Every advantage has been seized to facilitate this upward movement, and the improved conditions in iron and steel of the past two weeks, as well as the possibilities of the near future, have been greatly discounted. Steel scrap has borne the brunt of the advance. Cast and wrought scrap are sluggish, owing to the failure of bar iron makers and pig iron producers to realize higher prices on their products. In the minds of conservative buyers and sellers, it is not believed that the present boom in scrap can long prevail. The Santa Fé Railroad has an accumulation of 20,000 tons of scrap in its yards, which it has been holding for an active market, and the Burlington system is out this week with a list aggregating 2500 tons. The weather throughout the West is very mild, encouraging the accumulation of scrap and a possible early dumping of it on the local market. The prices quoted below are for delivery to buyers' works, all freight and switching charges paid. Sellers of scrap usually receive 50c. to $1 less in this dis-

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trict, owing to high switching charges. Following prices are per gross ton, delivered Chicago:

Old iron rails	$15.50 to $16.00
Old steel rails, rerolling	13.50 to 14.00
Old steel rails, less than 3 ft	12.75 to 13.25
Relaying rails, standard sections, subject to inspection	23.00 to 24.00
Old car wheels	13.00 to 13.50
Heavy melting steel scrap	12.50 to 13.00
Frogs, switches and guards, cut apart	12.50 to 13.00
Shoveling steel	11.50 to 12.00

The following quotations are per net ton:

Iron angles and splice bars	$14.00 to $14.50
Iron arch bars and transoms	15.25 to 15.75
Steel angle bars	11.50 to 12.00
Iron car axles	19.25 to 19.75
Steel car axles	18.00 to 18.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
Steel knuckles and couplers	11.50 to 12.00
Locomotive tires, smooth	17.50 to 18.00
Steel axle turnings	7.75 to 8.25
Machine shop turnings	7.00 to 7.50
Cast and mixed borings	5.75 to 6.25
No. 1 busheling	10.25 to 10.75
No. 2 busheling	7.75 to 8.25
No. 1 boilers, cut to sheets and rings	9.00 to 9.50
Boiler punchings	13.00 to 13.50
No. 1 cast scrap	12.00 to 12.50
Stove plate and light cast scrap	10.50 to 11.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.50 to 11.00
Pipes and flues	9.00 to 9.50

Philadelphia

PHILADELPHIA, PA., February 20, 1911.

The iron and steel markets maintain fully the recent gains reported and some branches show a further improvement. Foundry pig iron is being freely inquired for, but the bulk of the sales are confined to early delivery. Pig iron prices are being well maintained and the lowest sellers have stiffened up considerably. In finished materials a moderate gain in demand, with somewhat better specifications, is generally reported, and some mills are slightly more active. The old material market continues to broaden; prices have again advanced and in many cases it is not possible to get any quantity of the leading grades at present quotations.

Iron Ore.—Sales of quite heavy tonnages of foreign ore are announced. Sota & Aznar have just concluded arrangements for over 250,000 tons of Spanish ores to be brought over this year. Prices for the first half of the year are the same as in their last large sales in July, 1909. Prices for the second half on one grade will be reconsidered if there is any drop in lake ore prices. A large quantity of their Lucainena ore will be taken by the Warwick Iron & Steel Company, which will engage in the manufacture of low phosphorus pig iron. The largest part of the total tonnage sold was Sagmenera ore. Importations at this port during the week comprised one cargo of Cuban ore, 6300 tons, valued at $17,325.

Pig Iron.—While there has been little large lot business closed recently, a very fair movement has occurred in small and moderate quantities of foundry grades, the aggregate of which is fully equal to the recent average volume. The trade, therefore, feels encouraged with the situation, particularly as inquiries continue to come out quite freely covering consumers' near future as well as more extended requirements. Melters would, in a number of cases, contract for considerable iron for second and third quarter and even for last half delivery, if they could get it at recent quotations or probably even at a slight advance, but sellers refuse to consider anything beyond near future commitments. A good share of this inquiry has been of a quiet nature, prospective buyers preferring not to come before the trade generally. There is a decided firmness observable and it is understood that even in strongly competitive markets, sellers are not showing the same disposition to meet low prices made by producers located outside the district. A better demand is reported for Virginia foundry irons; inquiry has increased and the volume of business taken, while confined principally to small lots, has been a trifle larger. Prices also show increasing firmness and standard brands cannot be had at less than $13, furnace, for No. 2 X or No. 2 plain, delivery running over three to four months; while some sellers refuse to quote for strictly second quarter shipment, the leading interest will accept orders for such delivery at $13.50, furnace. In low grade foundry irons there has not been much business, although cast iron pipe makers have moderate inquiries before the trade. Sellers of Southern iron are holding prices firmly, as a result of which there has been little business transacted in this district. Several fresh inquiries for forge iron are reported, but buyers and sellers are still apart on prices. Basic iron is quiet; immediate requirements of consumers in this district are mostly supplied, and, while some melters would probably take on additional moderate quantities at the price prevailing during the recent movement, sellers are holding firmly at $15, delivered, and refuse to consider business of a forward character. Several moderate lot sales of low phosphorus iron are reported at the market. The following quotations are named for standard brands, for early delivery in buyers' yards in this vicinity:

Eastern Pennsylvania, No. 2 X foundry	$15.50 to $15.75
Eastern Pennsylvania, No. 2 plain	15.00 to 15.50
Virginia, No. 2 X foundry	15.80 to 16.00
Virginia, No. 2 plain	15.80 to 16.00
Gray forge	14.25
Basic	14.50 to 15.00
Standard low phosphorus	21.00 to 21.50

Ferromanganese.—There has been no fresh demand from consumers in this district and the market generally is reported quiet. For prompt shipment $37.50, Baltimore, is named, while $38 about represents the market for forward deliveries.

Billets.—Consumers continue to place orders in small quantities for prompt delivery and the aggregate business is slightly greater. Prices are being firmly maintained at $25.40, delivered here, for standard open hearth rolling billets, with ordinary forging billets at $30.40, delivered. The latter class of billets has been proportionately more active than rolling billets. Eastern mills are operating on a slightly better basis, but have not reached the rate of production reported by the majority of finished material mills.

Plates.—A very good business continues to be placed. In few instances are orders large, but there has been a steady demand for tank and boiler plates, as well as a fair share of car work, while specifications against orders for bridge plates have been more active. Reports from the trade are that users of plates generally are more active and the outlook for a continuation of the recently improved business conditions is considered quite favorable. Mills are maintaining their recent productive rate and a few have made further slight gains. Prices are being firmly maintained, 1.55c. delivered, representing the minimum quotation for ordinary plates delivered in this vicinity.

Structural Shapes.—While a slight betterment in the general demand is reported, the increase has not been as large as in other lines, owing to the absence of orders involving anything beyond small quantities. Several moderate building propositions are in sight, including a new Ritz-Carlton Hotel in this city. Current orders are mostly in small lots, for which prices are firmly maintained at 1.55c. minimum for plain shapes, delivered in this vicinity.

Sheets.—A very fair day to day demand is reported, sufficient to keep mills operating at full capacity, but there is still a lack of forward business, and order books are not in good shape for continuous operation. Prices are firm, the following range representing quotations of Eastern mills for early deliveries: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 and 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Bars.—Consumers of iron bars are coming into the market more freely, owing to the recent advance in prices, and efforts to get orders placed at prices prevailing previous to the withdrawal of quotations by makers have been generally unsuccessful. The market to-day is strong at 1.37½c. to 1.42½c. for refined iron bars, delivered in this vicinity, and the tendency appears to be toward a higher level. Steel bars are moderately active at 1.55c., delivered here.

Coke.—The movement is light, both in foundry and furnace grades. Prices for prompt coke are unchanged, but several producers have advanced prices of furnace coke for forward delivery, as high as $1.85 to $2 per net ton at oven, being named, although no business is done at that basis. While prices of foundry coke are somewhat firmer, quotations are practically unchanged, the following range being named, per net ton, for deliveries in buyers' yards in this vicinity:

Connellsville furnace coke	$3.75 to $3.90
Foundry coke	4.25 to 4.50
Mountain furnace coke	3.35 to 3.50
Foundry coke	3.85 to 4.10

Old Material.—The upward movement of prices continues, and at the present range it is almost impossible to get any large quantity of material. Melters have paid $14.50, delivered, for heavy melting steel and, while that figure is being offered for quantities, it is said that practically no steel comes out. Holders of practically all classes of material are refusing to let go, anticipating a still higher level and what little business is done has been for prompt shipment. The movement in heavy steel has affected other grades and an advance in prices is reported all along the line, although in instances the higher value is based on a comparative rather than actual basis. The rolling mills have been inquiring more freely and sales of choice No. 1 wrought scrap in moderate lots are reported as high as $17.50, delivered. Turnings and borings have also been sold at higher figures than recently quoted. The following range of prices about represents sellers' views of the market for deliveries

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in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia ranging from 35c. to $1.35 per gross ton:

No. 1 steel scrap	$14.50 to $15.00
Old steel rails, rerolling	15.75 to 16.25
Low phosphorus	18.00 to 18.50
Old steel axles	21.00 to 21.50
Old iron axles	26.00 to 27.00*
Old iron rails	18.00 to 18.50
Old car wheels	14.00 to 14.50
No. 1 railroad wrought	17.00 to 17.50
Wrought iron pipe	14.00 to 14.50
No. 1 forge fire	12.25 to 12.75
No. 2 light iron	8.00 to 8.50*
Wrought turnings	10.00 to 10.50
Cast borings	9.50 to 10.00
Machinery cast	14.50 to 15.00
Railroad malleable	12.00 to 12.50*
Grate bars	12.00 to 12.50
Stove plate	11.00 to 11.50

* Nominal.

The Warwick Iron & Steel Company, Pottstown, Pa., has made an arrangement with the Heckscher Furnace Department of the Alan Wood Iron & Steel Company, by which it will take over the low phosphorus iron contracts, ores and general low phosphorus pig iron business formerly conducted by that concern. The arrangement becomes effective about May 1.

Cleveland

CLEVELAND, OHIO, February 21, 1911.

Iron Ore.—The indications are that the early buying of ore during the coming spring before the opening of navigation will be quite light. A large share of the furnace interests will have enough of last season's ore to last them until the latter part of the summer, if not longer, and these see no reason for buying early. Early purchases will mean early payments on ore that many will not need before fall, and late purchases will enable them to defer starting payments until after contracts are placed. We quote prices as follows: Old range Bessemer, $5; Mesaba Bessemer, $4.75; old range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—A meeting of Ohio pig iron manufacturers was held in this city February 17. The general situation was discussed and the consensus of opinion was that the market is much firmer and the outlook more favorable. One or two makers of basic that have been making lower quotations have fallen in line and it is understood that $14, Valley furnace, is the minimum quotation to-day. Foundry iron is also firmer and it is claimed that none of the Valley furnaces is shading $14 for No. 2 for future delivery. One northern Ohio producer, however, is not maintaining this price. For Cleveland delivery for prompt shipment, $13.75 at furnace is being quoted, and about the same price is being named for outside shipment during the first half. The northern Ohio market is quiet. The only sales reported are a few lots of 300 tons and under, and the few inquiries that have come out have not been for larger tonnages. In Michigan and at other Western points the market has become more active and a number of inquiries for foundry and malleable grades in round lots have come out. Some buyers are still feeling the market with last half inquiries. Producers as a rule are unwilling to quote for the last half, but those who will take on tonnage that far ahead want an advance of 50c. a ton over first half prices. A limited tonnage has been sold at that advance. Local sellers have an inquiry for 300 tons of Southern foundry for the last half, but Southern furnaces are not inclined to quote for that delivery. For prompt shipment and the first half, we quote, delivered, Cleveland, as follows:

Bessemer	$15.90
Northern foundry, No. 1	14.50
Northern foundry, No. 2	$14.00 to 14.25
Northern foundry, No. 3	14.00
Gray forge	13.75
Southern foundry, No. 2	15.35
Jackson Co. silvery, 8 per cent. silicon	19.00

Coke.—The market is quiet, the only transactions being small lots of foundry coke for early shipment. Prices are stationary and firm. We quote standard Connellsville furnace coke at $1.45 to $1.55 per net ton, at oven, for spot shipment, and $1.60 to $1.65 for the first half. Connellsville 72-hour foundry coke is held at $2 to $2.15 for spot shipment and $2.25 to $2.50 for the first half.

Finished Iron and Steel.—The general outlook continues to improve. Both orders and inquiries during the past week were for larger tonnages than during the previous week, and there was a better volume of inquiries for contracts covering the first half. Carload orders are more plentiful than they have been for a number of months. Inquiries for contracts are mostly for steel bars. Large railroad orders and specifications were received during the week from the Lake Shore & Michigan Southern Railroad for its Western lines, these orders including 24,000 kegs of spikes. The Illinois Steel Company was given an order for 15,000 kegs of spikes, 5000 kegs of track bolts and about 750 tons of angle bars, and an order for 9000 kegs of spikes was divided between two independent interests. The demand for steel bars shows less improvement than some other lines, this being attributed to the fact that some of the bolt and nut manufacturers and other large consumers are substituting iron bars because of the lower prices quoted on the latter. Prices on steel bars, plates and structural material are firm at 1.40c., Pittsburgh. The structural situation continues quiet, but the outlook is good. T. H. Brooks & Co., Cleveland, have taken the contract for a plant for the Republic Rubber Company, Youngstown, Ohio, requiring 180 tons. The contract for an addition to the Y. M. C. A. Building in Detroit, requiring 200 tons, has been let to Whitehead & Kales of that city. The demand for sheets is more active and prices appear to be firmly maintained. There is an improved demand for light rails in carload lots. The demand for iron bars, which recently improved, is fairly good. Prices are firm at 1.30c., at mill. Warehouse business with jobbers shows an improvement.

Old Material.—There is considerable inquiry for scrap for March and April delivery from both local and outside mills. Not much tonnage has been sold during the week, but dealers are looking for a fairly active buying movement after the present feeling of the market. Further advances have been made on a number of grades. The market is very firm and it is doubtful whether concessions from present quotations can be secured except on small lots of material on the cars. In fact dealers are looking for a further advance and say they do not care to sell much tonnage at present quotations. The Nickel Plate Railroad closed February 21 on its usual tonnage. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$14.00 to $14.50
Old iron rails	16.00 to 16.50
Steel car axles	19.50 to 20.00
Heavy melting steel	13.25 to 13.50
Old car wheels	13.00 to 13.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	12.00 to 12.50
Railroad malleable	13.00 to 13.50
Light bundled sheet scrap	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	6.50 to 7.00
Iron and steel turnings and drillings	7.50 to 8.00
Steel axle turnings	9.00 to 9.25
No. 1 busheling	11.50 to 12.00
No. 1 railroad wrought	13.00 to 13.25
No. 1 cast	12.00 to 12.50
Stove plate	11.00 to 11.25
Bundled tin scrap	11.00 to 11.50

St. Louis

ST. LOUIS, February 20, 1911.

All interests identified with the iron trade report an enlargement of inquiry. Manufacturers of cement state that for January their sales were over 20 per cent. in excess of the same month last year, owing in a measure to the open winter. Clearings in St. Louis, Kansas City and St. Joseph, as reported by the banks, were again in excess of the same week last year.

Pig Iron.—Increased interest continues to characterize the pig iron market. A number of inquiries are still pending. In several cases buyers and sellers continue apart in their views, both with regard to the older and some new business which developed within the past few days. Instead of sellers making concessions from current prices, as expected by some intending buyers, they were confronted with firm and in some instances slightly higher prices. There is also a degree of contention over the range of delivery and some transactions could not be worked on account of the premium asked for the third quarter. An inquiry is out by an Illinois stove manufacturer for 1000 tons of Southern No. 2 foundry for shipment over the second and third quarters. One of the leading sales agencies reports the sale of 1600 tons of Northern and Southern iron for shipment over the remainder of the first half. A leading interest reports sales of Southern foundry iron aggregating 10,775 tons in St. Louis territory, for shipment mainly over the remainder of the first half. Well posted parties estimate that upward of 40,000 tons of pig iron have been contracted for in the past four weeks. A feature of the situation is the receipt of requests to anticipate contract delivery. Merchant sellers report a fair activity in buying by small consumers. Prices continue unchanged, but the tone of the market is stronger. We quote Southern No. 2 foundry, for shipment over the remainder of the first half, $11, f.o.b. Birmingham. For shipment over the third quarter, $11.50 is asked.

Coke.—With most offices the market on coke ruled quiet, but specifications on contract came in fairly well. A leading

Mechanical and Civil Engineers
PITTSBURGH, PA.

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sales agency reports sale of 2000 tons of foundry coke for forward delivery. Merchant sellers are finding a fairly good inquiry from small consumers. We quote 72-hr. Connellsville foundry for shipment over the remainder of the first half at $2.10 per net ton, f.o.b. oven, for shipment over the remainder of the year $2.20. For special brands and carload lots, 25c. to 50c. more per ton is asked.

Finished Iron and Steel.—The leading interests report an increase in inquiry for structural material coming both from structural shops and from car builders. There is a better demand for finished steel than for iron. Manufacturers of implements, wagons, &c., are in the market for material and there is a good inquiry from the railroads for track supplies and equipment.

Old Material.—The improved feeling in pig iron is reflected in the scrap iron and steel market. Leading dealers state that prices are firm and tending upward. There were no railroad offerings the past week. The inquiry from consumers is increasing. We quote dealers' prices, per gross ton, f.o.b. St. Louis:

Old iron rails	$13.50 to $14.00
Old steel rails, rerolling	12.50 to 13.00
Old steel rails, less than 3 ft	12.00 to 12.50
Relaying rails, standard sections, subject to inspection	22.50 to 23.00
Old car wheels	12.50 to 13.00
Heavy melting steel scrap	11.50 to 12.00
Frogs, switches and guards, cut apart	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates	$11.00 to $11.50
Iron car axles	18.50 to 19.00
Steel car axles	17.00 to 17.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Railway springs	10.00 to 10.50
Locomotive tires, smooth	16.00 to 16.50
No. 1 dealers' forge	9.00 to 9.50
Mixed borings	4.50 to 5.00
No. 1 busheling	10.00 to 10.50
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	11.50 to 12.00
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	8.50 to 9.00
Agricultural malleable	8.00 to 8.50
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	8.00 to 8.50
Railroad grate bars	8.00 to 8.50
Machine shop turnings	7.00 to 7.50

The Cane Creek Iron Ore Company has been incorporated. The capital stock is $1,000,000. The incorporators are Frank H. Mitchell, Lee F. Mitchell and George L. McBride of St. Louis; D. W. Thompson of Randolph, Ill.; J. J. Love of Bloomington, Ill., and G. W. Witson of Ovalaska, Wis.

The Beck & Corbitt Iron Company will erect an addition to its present building, which will then cover the entire block at the corner of Main and O'Fallen streets. These improvements, when completed, will cost in the neighborhood of $80,000, and will give the company a seven-story building. The structure will be the most modern, as well as the most complete one devoted exclusively to heavy hardware.

The May Department Stores Company has purchased the William Barr Dry Goods Company and a new building will be constructed, which will cost about $6,000,000. It will be 21 stories and construction will start in June.

Cincinnati

CINCINNATI, OHIO, February 21, 1911.

Pig Iron.—Northern basic and Southern foundry show considerable activity for second quarter shipment. Of Northern basic 10,000 tons was contracted for last week at a price about 80c. above that of November 1. Another lot of approximately 15,000 tons is reported to have been bought by a southern Ohio manufacturer with deliveries extending through the third quarter. Between 5000 and 6000 tons of basic was also taken by a northern Ohio company from a nearby furnace. Among Southern foundry sales are 6000 tons to a pipemaker, with shipments extending through the third quarter, and a substantial tonnage for spot and second quarter shipment is being taken by consumers who generally buy medium-sized quantities. A few sales of No. 2 foundry for the third quarter have been made at $11.50, Birmingham, and there was one for second half. Many offers of $11 for Southern No. 2 foundry are being received for last half shipment, but they are promptly refused and several furnaces are now asking $11.50 for any shipment after March 1. Low grade Southern iron is scarce. Malleable is in demand and in addition to smaller inquiries two Indiana manufacturers want 1500 and 2000 tons respectively, both for July to December delivery. For prompt shipment malleable is obtainable at $14 to $14.50, Ironton, for the first half. Northern No. 2 foundry remains at $14, Ironton. There is quite a demand for ferrosilicon and ferromanganese. Several small lots of high silicon iron have been sold lately. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows, for first quarter:

Southern coke, No. 1 foundry	$14.75
Southern coke, No. 2 foundry	14.25
Southern coke, No. 3 foundry	13.75
Southern coke, No. 4 foundry	13.50
Southern coke, No. 1 soft	14.75
Southern coke, No. 2 soft	14.25
Southern gray forge	13.00
Ohio silvery, 8 per cent. silicon	18.20
Lake Superior coke, No. 1	15.70
Lake Superior coke, No. 2	15.20
Lake Superior coke, No. 3	14.70
Standard Southern car wheel	25.25
Lake Superior car wheel	19.50

Coke.—Furnace coke has shown a little activity, but the transactions closed cover very small quantities. Foundry coke is very dull and sales are for carload lots to fill immediate requirements. Prices remain unchanged. For Connellsville furnace coke we quote $1.50 per net ton at oven for prompt shipment, with the usual advance of 10c. to 15c. on time contracts. Pocahontas and Wise county furnace coke are quotable around $1.65 to $1.75 for spot shipment, with a slight advance for the first half. Foundry coke is obtainable in all three fields at $2 to $2.15 for immediate shipment, with $2.25 per net ton at oven representing the average contract price.

Finished Material.—Steel bars continue to show steady improvement. Hoops and bands have also been bought more freely lately. The inquiry for structural material is good, but actual sales were a trifle slow the past week. The Pittsburgh mill price is 1.40c. and warehouse figures range from 1.80c. to 1.95c.

Old Material.—There is an unconfirmed report that one of the larger railroad systems will offer a large quantity of scrap soon. Prices remain firm, but not much scrap is moving. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton	$12.00 to $12.50
Cast borings, net ton	5.00 to 5.50
Steel turnings, net ton	6.00 to 6.50
No. 1 cast scrap, net ton	11.00 to 11.50
Burnt scrap, net ton	8.00 to 9.00
Old iron axles, net ton	17.50 to 18.50
Busheled sheet scrap, gross ton	8.50 to 9.00
Old iron rails, gross ton	14.50 to 15.50
Relaying rails, 50 lb. and up, gross ton	21.50 to 22.50
Old car wheels, gross ton	12.00 to 12.50
Heavy melting steel scrap, gross ton	11.00 to 11.50

The German Iron Trade

A Central Selling Agency for Bars

BERLIN, February 9, 1911.

The event of the week in the iron trade was a second meeting of the bar interests three days ago at Dusseldorf to consider continuing the present price convention, or to substitute a more complete form of organization for it. The meeting did not reach a decision, but it appointed a committee to work out a plan for organizing on the basis of a common selling agency, and adjourned to February 22 to take action on this proposal. There is a strong sentiment in favor of this form of combination, while most of the works are quite indifferent to prolonging the present price agreement, which expires at the end of March. However, two important companies were not represented at this week's meeting. One of these, the Gelsenkirchen Company, ranks second to Krupp's in importance among the German iron companies. The other was the Peiner Walzwerke, at Peine, near Hanover, outside of the Rhenish-Westphalian district. The latter concern has already declared that it will not join the new combination, evidently proposing to avail itself of its favorable geographical situation for supplying the territory lying to the east and north. It is believed, however, that the organization will be perfected. The fact that the present drawback on bars would be withdrawn by the Steel Works Union if the bar organization should fail of renewal will serve as a powerful incentive for keeping up some form of combination. Meanwhile the sale of bars has been stopped pending the result of the next meeting. The view is pretty general that the new organization, if it is reached at all, will reduce the existing bar price of 112 to 114 marks per ton.

Pig Iron Output at a New High Rate

The general situation in the iron trade shows few changes. Business remains rather quiet, but goods on order are being generally taken at the normal rate. The production of pig iron continues to mount into new records. The January figures published to-day show a total of 1,320,685 tons, which is 13,600 tons more than for December and 143,100 tons more than for January, 1910. The home demand for pig has not been coming forward since the beginning of the year in a satisfactory volume, but foreign orders continue to arrive in considerable amounts. The prices for export are cut pretty low in competition with foreign producers. The Essen Pig Iron Syndi-

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cate, which went into operation in October for a limited period, is now about to begin negotiations for its prolongation, and efforts will again be made to induce the Siegerland furnaces to join, they having refused to enter the present organization. The iron mines in that region are quite busy. Ores are being called for delivery briskly. The mines are working to 90 per cent. of their possible capacity. The imports of foreign ores in January amounted to only 264,800 tons, or less than half as much as a year ago. Foreign ores, however, are in strong demand and are scarce, especially Swedish ores. German ironmen who acquired ore properties in Normandy, France, a year or two ago are pushing their development work forward rapidly, and ores will soon be coming from there to the lower Rhine furnaces.

Activity in Finished Lines

The foreign market continues to send in good orders for heavy steel rails, but the orders of the home railroad authorities remain very light. The market for structural forms is very quiet. A meeting of the union toward the end of the month will take action on structural prices during the June quarter, but it is understood that they will be left unchanged. Plate mills running on heavy forms have plenty of work ahead for a month or two, but sales for the June quarter have not yet been declared open. Business in wire stock is pretty active, but manufacturers of wire nails complain of light orders, foreign buyers in particular showing a marked tendency to hold back.

The most active section of the iron trade is that of the foundries. Both home and foreign buyers are sending in orders at a brisk rate, and the shops have all the work they can manage. It is expected that the building trade will show a considerable revival in the spring, which would increase the demand for certain forms of castings. The orders for machine castings have been materially increased since the end of December, corresponding with the activity in the machinery trade.

The exports of pig iron in January amounted to 59,532 tons, against 53,752 tons in January, 1910; steel material, 53,369 tons, against 42,692; beams, 18,874 tons, against 21,623; steel rails, 34,986 tons, against 29,093, and ties, 11,600 tons, against 11,649.

The reports from the Belgian market this week are better. An advance of 1 franc a ton in the price for export bars is mentioned in a Brussels dispatch of to-day. Market reviews sent in by mail also speak in a considerably more hopeful tone. Needless to add that the German trade is greatly encouraged by the better reports now arriving from the American market. The summaries of *The Iron Age's* weekly reviews are regularly cabled to the German press, and these are just now attracting unusual attention.

The Krupp Company in a New Line

The Krupp Company has made an agreement, amounting almost to a fusion, with the Westfalische Drahtindustrie of Hamm, in Westphalia, which is the most important wire mill on the Continent. Under this arrangement the capital of the Hamm concern, which is now 10,000,000 marks, will be increased to 16,000,000, and the Krupp Company will take all the new stock. The old stockholders are guaranteed a dividend of 5 per cent., and above that Krupp and the wire concern get the same dividend till 7 per cent. is reached, after which the latter gets an additional half per cent. for every additional one per cent. for Krupp. In other words, the two companies are to be operated practically as under one management. The arrangement is to stand 30 or probably 40 years, after which time the Krupp Company has the right to buy the wire company outright at a price fixed in the agreement. It is understood that the Krupp Company was influenced in making the arrangement by the wish to secure a big and steady customer for its surplus steel. The fusion is another illustration of the tendency with the great iron and coal companies to add new branches of more finished products, partly for the purpose of consuming their raw steel in their own mills, and partly for making themselves strong enough to stand alone if the big Steel Works Union should not be renewed.

Birmingham

BIRMINGHAM, ALA., February 20, 1911.

Pig Iron.—The situation has developed unusual strength here. One interest has withdrawn entirely from the market; another has marked its price up to $11.50 for deliveries over the second quarter, while still others are confining sales to prompt shipment orders only. It is known that one company turned down orders for several thousand tons last week at $11 for No. 2, having taken on all the business wanted at that figure. One of the best indications of more strength to the pig iron situation now is that the buying the past two weeks has been from all classes of consumers, whereas heretofore the bulk of the purchases have been by the pipe makers, with some fair tonnage going to the agricultural implement people. There is, however, quite a lot of pig on furnace banks, and this stock will have a tendency to hold the price down, doubtless, for some weeks, unless an unusually good buying movement should set in, which is not expected now. Furnace companies in this district generally report their movement of iron from yards this month as being in excess of the daily make, and it would not be a surprise to many of them if March 1 should find Alabama furnace stocks materially lower than on February 1, at which time these stocks aggregated in round numbers 300,000 tons. None of the manufacturers here appears to be expecting any increase in production soon. At the same time, there is no particular stack that now appears likely to blow out, for repairs or otherwise, for some months; so it would appear that production should continue at about the same rate as for the last several months.

Cast Iron Pipe.—Producers report a better feeling and an actually better movement, stocks having been reduced materially thus far this year. This would indicate that, with any advance in the price of pig iron, pipe would correspondingly improve. Sales have been of unusually good volume throughout the Central West, where some splendid tonnages have been placed on municipal contracts. It is difficult to say in all cases just how low some sellers have gone in bidding for business. This makes it hard to quote with any degree of accuracy a stable line of prices. The following figures rule to-day, all per net ton, on board cars here: 4 to 6 in., $21; 8 to 12 in., $20; over 12-in. average $19. Gas pipe takes $1 per ton higher.

Old Material.—The improvement in pig iron is reflected to a degree in scrap. Buyers find it difficult to pick up the bargains that prevailed two weeks ago. There is still quite an accumulation of odds and ends on this market, but it is being held much more firmly. We quote, nominally, dealers' asking prices on board cars here, per gross ton, as follows:

Old iron axles	$14.00 to $14.50
Old iron rails	12.50 to 13.00
Old steel axles	12.50 to 13.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	9.50 to 10.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.50 to 8.00
No. 1 machinery	10.00 to 10.50
No. 1 steel	9.50 to 10.00
Tram car wheels	9.00 to 9.50
Standard car wheels	10.50 to 11.00
Light cast and stove plate	8.00 to 8.50

New York

NEW YORK, February 22, 1911.

Pig Iron.—It is estimated that 7000 to 8000 tons of foundry iron has been bought in New England in the past week and low prices have prevailed there, prices which a number of sellers say they are not disposed to meet. It is understood that most of the business went to western New York furnaces, a good part of it to Buffalo. Prices asked at Buffalo for Eastern shipment have ranged from $13.25 to $14 for No. 2 X foundry, and there are indications that the $15.50 price, delivered in New England, was carried over from the preceding week, this representing $13.05 at Buffalo furnace. Irregularity in prices continues, but all sellers seem to be making an effort to get out of the slough into which the market fell two weeks ago, and some assert that the turn has come. Machinery foundries in New Jersey have placed some business, chiefly with eastern Pennsylvania furnaces, and the latter are somewhat firmer in their views. Virginia furnaces are competing less sharply. A sale of 10,000 tons of Virginia pipe iron, No. 3 and gray forge, to one interest in that State has helped in the cleaning up of those grades. We quote, for tidewater delivery, as follows: Northern No. 1 foundry, $15.50 to $15.75; No. 2 X, $15.25 to $15.50; No. 2 plain, $14.75 to $15; Southern No. 1 foundry, $15.50 to $15.75; No. 2, $15 to $15.25.

Finished Iron and Steel.—In this territory trade in all lines, except bars, is very quiet, and notably so in plates and structural material. In bar iron and its products, trade is more active than for many months; good inquiries and orders are being received, especially from the railroads. Otherwise little business is coming from the railroads, contrary to expectations entertained when they appeared to be coming quite actively into the market a few weeks ago. Steel bars also show improvement, one large producer reporting 100 per cent. better specifications so far this month than for the corresponding period of January. February generally has been disappointing as compared with the preceding month, and the lull which was thought to be only temporary still continues. Conditions, while no better, are no worse, however, and some encouragement is taken from the fact that bar iron mills have felt warranted in advancing the price $1 a ton. Structural awards reported are not large and include 700 tons for the Westevelt cotton mill at Greenville, S. C., taken from the Gallivan Building Company, the general contractor, by the American Bridge Company; 300

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tons for the addition to the Hotel Emerson in Baltimore, also taken by the American Bridge Company; 400 tons for a viaduct for the Richmond & Henrico trolley line, Richmond, Va., taken by the Virginia Bridge Company; 500 tons for the Ontario & Western shops at Middletown, N. Y., and 500 tons for a warehouse for the Standard Oil Company at Newark, N. J., awarded the McClintic-Marshall Construction Company; 200 tons for an ash pit and coaling station for the Philadelphia & Reading at St. Clair, Pa., awarded the Eastern Steel Company; 200 tons for a small bridge for the Boston & Maine, taken by the Phoenix Bridge Company, and 100 tons for a small bridge for the New Haven, taken by Lewis F. Shoemaker & Co. The Boston Elevated Railway has also awarded 500 tons, probably to the Boston Bridge Works. Bids are in, but no award is reported on the 4000 tons for shops for the Delaware & Hudson at Watervliet. Bids closed February 21 on piers at New Orleans, for which 1500 tons will be required, and will be received up to March 1 on a pier for the Central Railroad of New Jersey at Communipaw, requiring 1000 tons. The Boston & Maine has an additional inquiry out for five small bridges aggregating about 200 tons. In connection with the award of the steel for the warehouse for the Union Bag & Paper Company, mentioned last week, it should have been stated that Hamilton & Chambers, New York City, have the general contract. The Virginia Bridge Company was low bidder on two swing span bridges for the Georgia Coast & Piedmont Railroad, requiring 400 tons. With the exception of bar iron, prices remain unchanged: Plain structural material, plates and steel bars, 1.56c. to 1.61c., and bar iron, 1.40c. to 1.45c., all New York. Plain material from store, New York, 1.85c. to 1.95c.

Ferroalloys.—There are only a few inquiries for small amounts of ferrosilicon and the quotation is between $54.50 and $55. Some fair-sized lots of ferromanganese are being asked for and dealers here are quoting $37.50 to $38, Baltimore.

Steel Rails.—The Chicago & Northwestern has just placed a contract for 40,000 tons and further negotiations are under way with Western roads. The export trade keeps up, and in the past week the Buenos Aires & Pacific has closed for 15,000 tons of 70-lb. rails. The Manila Railways will buy 10,000 tons. From the Manchurian Railways, with which American mills have done business for a number of years, an order has come for 1000 tons of frogs and switches. The Metropolitan Street Railway Company, New York, will buy 3000 tons of girder rails and the Transit Development Company of Brooklyn, 2000 to 3000 tons. The Public Service Corporation of New Jersey has bought 2000 tons of girder rails. The Interborough, which recently bought 4000 tons of T rails from the Lackawanna Steel Company, has been in the market for 1000 tons additional.

Cast Iron Pipe.—The most important letting now in sight is by the city of Brockton, Mass., 1200 tons, on which bids will be opened February 24. New York City will purchase a moderate quantity of water pipe March 1. John Fox & Co., 253 Broadway, New York, were among those who received a considerable part of the recent purchase of gas pipe by the Brooklyn Union Gas Company, and not John Fox, Jr., as incorrectly stated in last week's report. The demand from private gas and water companies continues. The statement is made that two companies are now in the market for about 100 miles of pipe. The situation is reported as steadily improving, the foundries gradually increasing their percentage of operation. Quotations are continued at $21.50 to $22 per net ton, tidewater, for carload lots of 6 in.

Old Material.—The volume of business has increased materially. A great deal more could be done, as inquiries are numerous, but dealers are conservative in making contracts, fearing that they may find it difficult to cover them at a price which will afford a profit. While some of the current business is being done with consumers, the greater part of the buying is by dealers. The speculative feature of the old material trade is apparent in some of these purchases, although a portion goes to apply on contracts previously made. Prices show increased strength. Quotations per gross ton, New York and vicinity, are as follows:

Old girder and T rails for melting	$11.00 to $11.50
Heavy melting steel scrap	11.00 to 11.50
Relaying rails	20.50 to 21.00
Standard hammered iron car axles	23.50 to 24.00
Old steel car axles	17.00 to 17.50
No. 1 railroad wrought	13.50 to 14.00
Wrought iron track scrap	12.50 to 13.00
No. 1 yard wrought, long	12.50 to 13.00
No. 1 yard wrought, short	11.50 to 12.00
Light iron	5.50 to 6.00
Cast borings	6.50 to 7.00
Wrought turnings	6.50 to 7.00
Wrought pipe	10.50 to 11.00
Old car wheels	12.50 to 13.00
No. 1 heavy cast, broken up	12.50 to 13.00
Stove plate	10.00 to 10.50
Locomotive grate bars	9.50 to 10.00
Malleable cast	12.50 to 13.00

Metal Market

NEW YORK, February 21, 1911.

THE WEEK'S PRICES

Cents Per Pound for Early Delivery.

	Copper, New York,			Lead.		Spelter.	
Feb.	Lake.	Electrolytic.	Tin. New York.	New York.	St. Louis.	New York.	St. Louis.
16	12.75	12.37½	{44.50 / 45.00}	4.42½	4.27½	5.57½	5.42½
17	12.75	12.37½	44.20	4.42½	4.27½	5.57½	5.42½
18	12.75	12.37½	....	4.42½	4.27½	5.60	5.45
20	12.75	12.37½	45.00	4.42½	4.27½	5.60	5.45
21	12.75	12.37½	44.75	4.42½	4.27½	5.60	5.45

Tin continues to sell at higher prices than the cost of importation. Copper is uncertain, but there has been a fair amount of buying. Lead is cheaper. Spelter is slightly higher and firmer. Antimony has again advanced.

Copper.—While there is talk of shading in prices of lake copper, there is little evidence of a disposition on the part of the leading sellers to make any reduction. There may have been a few sales of certain brands during the week at a lower price than the average market quotation, but the regular dealers are asking 12.75c. for lake and they are making a few sales. There is a fairly good demand for electrolytic and a number of sales of several carload lots were made from New York warehouses at 12.37½c. The exports of copper so far this month have not been very heavy, amounting in all to 11,673 tons. In London to-day spot copper was sold for £55 3s. 9d., and futures brought £55 17s. 6d. The sales amounted to 250 tons of spot and 300 tons of futures. The market closed dull.

Pig Tin.—Not in a number of years has the pig tin situation been in such a deplorable condition as it is at present. It is estimated that little more than 100 tons of tin is available for the average consumer. Two leading consumers are holding most of the stocks in New York warehouses, and they need the metal for their own use. No relief is in sight for this month, as the only tin expected to arrive in the near future will come in next Monday, when a steamer will bring 625 tons. This tin has already been contracted for, largely by consumers. The steamer Minnehaha arrived to-day with 775 tons, but most of its cargo was arranged for. Some dealers managed to buy in small lots of this tin yesterday at 44c. The metal will not be laid down in the warehouses until Friday. Stocks on both steamers available for general consumption are included in the estimate above. Dealers are not particularly anxious to do business, as they would be obliged to pay a very high premium, and take their chances on getting rid of what little metal they might be able to contract for. This morning pig tin in New York for early delivery was selling at 45c., as against an import price of 42.60c. This makes the premium on spot tin 2.40c. a pound. Some consumers throughout the country are holding stocks bought within the last two weeks at a record price, and many of them have more than they can use in the next six weeks. Their position is different from that of the two leading consumers, who contracted for their supplies several months ago. If the situation is relieved a month from now and tin becomes cheaper those who bought at high prices for future needs will suffer. The arrivals so far this month have been 3070 tons, and there are 2198 tons afloat, of which very little will get to this country this month. Pig tin was sold in New York this afternoon for 44.75c. The London market closed strong, with spot tin held at £194 15s. and futures selling at £191 5s. The sales of futures were 420 tons. No sales of spot are reported.

Tin Plates.—Orders for tin plates are coming in in good volume, and some of the independent mills continue to charge a little premium over the price charged by the leading interest. The quotation on 100 lb. coke plates in New York is $3.94. Foreign tin plate mills have all the business they can handle. The price for Swansea plates is 15s.

Lead.—The leading interest is practically out of the market, and a reduction in its quotations is looked for, as outside sellers are shading prices all along the line. The St. Louis market is especially weak and the New York market is sagging. Consumers are holding off in the expectation of a sharp decline. Late last Thursday the outside sellers were offering lead at 4.42½c., a reduction of 2½c. under the price of the day before. Lead can be purchased at that figure in New York to-day, and St. Louis dealers as a rule are quoting 4.27½c., although there are reports of price cutting there.

Spelter.—A slight advance has been made in spelter and some consumers have been forced into the market. It is believed among the dealers that consumers' stocks are low and there is very little spot spelter in New York, although plenty can be had from East St. Louis on short notice. The usual quotation is 5.45c., St. Louis, and 5.60c., New York. There is so little buying to-day that prices are largely nominal.

Antimony.—The antimony market has wakened up

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again as the result of rumors that leading producers abroad were renewing their flirtations of a few weeks ago, looking toward the establishment of a selling agreement. A sale of a 50-ton lot of Chinese antimony was made during the week at 7.25c. and a few sales of Hallett's were noted at 8c., which is an advance of 25 points over the quotation a week ago. Cookson's is firm at 8.25c. The continued policy on the part of sellers of Cookson's to keep the price up has encouraged other holders to take faith in the rumors regarding the European combination.

Old Metals.—A fair demand is reported. Dealers' selling prices are as follows:

	Cents.
Copper, heavy cut and crucible	12.00 to 12.25
Copper, heavy and wire	11.50 to 11.75
Copper, light and bottoms	10.75 to 11.00
Brass, heavy	8.00 to 8.25
Brass, light	6.75 to 7.00
Heavy machine composition	10.50 to 10.75
Clear brass turnings	7.75 to 8.00
Composition turnings	9.00 to 9.25
Lead, heavy	4.20 to 4.25
Lead, tea	3.95 to 4.00
Zinc scrap	4.25 to 4.30

Metals, St. Louis, February 20.—Lead is quiet; quoted at 4.30c.; spelter is stronger and held at 5.45c., both at East St. Louis. Zinc ore influenced by the stronger market for spelter is firm at $40 to $41 per ton, Joplin base. Tin is higher at 45.35c.; antimony (Cookson's) unchanged at 8.00c.; lake copper unchanged at 13.10c.; electrolytic ditto at 12.70c., all at St. Louis. The demand for finished metals was quite fair the past week and railroad buying has started up again.

Metals, Chicago, February 20.—Pig tin and spelter are each higher this week, both products enjoying a brisk demand. Copper is dormant, but unchanged in price. Lead is weaker and lower prices are quoted. Chicago prices are as follows: Casting copper, 12⅝c.; lake, 12¾c. to 12⅞c. in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 45½c.; small lots, 48c.; lead, desilverized, 4.35c. to 4.40c. for 50-ton lots; corroding, 4.60c. to 4.65c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.50c. to 5.55c.; Cookson's antimony, 10¼c., and other grades, 9c. to 10c. in small lots; sheet zinc is $7.50, f.o.b. La Salle, in carloads of 600 lb. casks. There is a fair demand for old metals and prices are stronger, in sympathy with the scrap iron market. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12½c.; copper bottoms, 10c.; copper clips, 12c.; red brass, 10½c.; yellow brass, 9c.; lead pipe, 4⅜c.; zinc, 4¼c.; pewter No. 1, 29c.; tin foil, 34c.; block tin pipe, 37c.

Notes on Prices

Rope.—Comparison of present rope prices with those ruling just previous to the financial disturbance in 1907 would seem to indicate that present prices offered an excellent opportunity for buying. During the last of October, 1907, rope quotations, on the basis of 7-16 in. in diameter and larger, were as follows: Pure Manila, 11½c. to 12c.; B quality Manila, 9c. to 9½c.; pure sisal, 9c.; lower grades sisal, 7¼c. to 7½c. The following quotations represent prices to the retail trade in the Eastern market for rope 7-16 in. in diameter and larger, with card advances for smaller sizes: Pure Manila of the highest grade, 8¾c. to 9¼c. per pound; second grade Manila, 7¾c. to 8¼c. per pound; hardware grade, 7¼c. to 7¾c. per pound; pure sisal of the highest grade, 6¾c. per pound; second grade, 6¼c. per pound; rove jute rope, ¼-in. and up, No. 1, 6½c. to 7c. per pound; No. 2, 6c. to 6½c. per pound.

Linseed Oil.—The advance of 1c. a gallon has not increased the demand, which has been no more than normal. Carload lots of oil are quoted on the basis of 94c. to 95c., with a very firm market. The following quotations represent New York prices in five-barrel lots or more:

	Cents.
State, raw	96
City, raw	96

Oil in lots of less than 5 bbl., 1 cent advance per gallon.
Boiled oil, 1 cent advance per gallon over raw.

Naval Stores.—High prices of turpentine restrict active buying by large manufacturing consumers, who are purchasing only as they actually need it. The Savannah market, where light stocks are the rule, is firm. New York quotations in five-barrel lots are as follows:

	Cents.
In oil barrels	91
In machine barrels	91½

Less than 5-bbl. lots, ½ cent advance per gallon.

Rosins continue firm on moderate demand at higher prices. On the basis of 280 lb. to the barrel, common to good strained is quoted at $7.35 and grade D at $7.70 in the New York market.

Iron and Industrial Stocks

NEW YORK, February 21, 1911.

The stock market maintains its strength, although transactions are not in large volume. Railroad equipment stocks advanced, and there was an especially sharp rise in Cambria Steel. The range of prices on active iron and industrial stocks from Wednesday of last week to Monday of this week was as follows:

Allis-Chalm., com.	7⅞ - 8½	Railway Spr., com.	36 - 37¼
Allis-Chalm., pref.	32 - 32¼	Republic, com.	34 - 35
Beth. Steel, com.	31¼ - 32¾	Republic, pref.	98¼ - 99¼
Beth. Steel, pref.	62 - 64	Sloss, com.	53¾ - 55
Can, com.	9½ - 9¾	Sloss, pref.	112 - 112½
Can, pref.	80 - 81¾	Pipe, com.	17½
Car & Fdry, com.	54¾ - 56¾	Pipe, pref.	57 - 57⅝
Steel Foundries	49½ - 51	U. S. Steel, com.	79 - 81⅝
Colorado Fuel	33⅞ - 35	U. S. Steel, pref.	118½ - 119⅝
General Electric	153¼ - 154¾	Westinghouse Elec.	69½ - 71
Gr. N. ore cert.	61 - 63¼	Va. I., C. & C.	64
Int. Harv., com.	116⅞ - 121½	Am. Snip, com.	77 - 78
Int. Harv., pref.	122¾ - 124	Chi. Pneu. Tool.	49½ - 51¾
Int. Pump, com.	42 - 43⅝	Cambria Steel	45¼ - 48⅞
Int. Pump, pref.	88 - 88⅞	Lake Sup. Corp.	29¾ - 30¾
Locomotive, com.	40¼ - 43½	Warwick	10¾ - 11
Nat. En. & St., com.	18	Crucible St., com.	13¼ - 14⅜
Nat. En. & St. pref.	86½ - 90	Crucible St., pref.	80¼ - 81¾
Pittsburgh St., pref.	101¾	Harb.-W. Ref., com.	40½ - 41
Pressed St., com.	35 - 36	Harb.-W. Ref., pref.	95
Pressed St., pref.	119¼		

Dividends.—The Harbison-Walker Refractories Company has declared the regular quarterly dividend of one-half of 1 per cent. on the common stock, payable March 4.

The Nova Scotia Steel & Coal Company has increased the dividend rate on the common stock from 5 to 6 per cent., the first quarterly dividend at the rate of 1½ per cent. being payable April 15.

The Railway Steel Spring Company has declared the regular quarterly dividend of 1¾ per cent. on the preferred stock, payable March 20.

The International Harvester Company has declared a quarterly dividend of 1¼ per cent. on the common stock, payable April 15, an increase of ¼ of 1 per cent. quarterly.

Great Northern Iron Ore Properties has declared a dividend of 50 cents per share, the same as in November, 1910. Previous dividends were 50 cents declared in August and February, 1910, and $1 in August, 1909, February, 1908, and August, 1907.

An International Iron and Steel Conference

An international meeting of iron and steel manufacturers, similar to that held in New York in October, 1910, will be held in Brussels, Belgium, beginning July 5, 1911. A delegation of steel manufacturers representing the American Iron and Steel Institute will attend. It is expected that the iron and steel interests of Great Britain, Germany, France, Belgium, Austria-Hungary, Italy, Spain and Russia will also be represented. The organization which is now being formed will be known as the International Iron and Steel Institute.

Lowenthal & Co., Buffalo, N. Y., have opened a branch in the Ford Building, Detroit, Mich., in addition to their branches in Buffalo, Cleveland and Cincinnati. Their Elco high-speed steel can also now be obtained in Philadelphia through Barrett & Co., Witherspoon Building, and in Boston through H. W. Hayes & Co., with whom they have agency arrangements.

The Andrews & Hitchcock Iron Company, operating two blast furnaces at Hubbard, Ohio, has re-elected officers as follows: Frank Hitchcock, president; W. J. Hitchcock, vice-president and general manager; H. W. Heedy, secretary and treasurer; directors: M. I. Arms, Mrs. Louis Andrews, John Shaw, Frank and W. J. Hitchcock and H. W. Heedy.

The Union Steel Casting Company, Pittsburgh, has purchased from the Pittsburgh Railways Company 3½ acres of land adjoining its plant. Large additions are contemplated, plans for which have not yet been prepared. The company had an option on 20 acres of ground near Tarentum, Pa., on which it intended to build a new plant, but this plan has been given up.

The Muncie Foundry & Machine Company, Muncie, Ind., having refused to unionize its establishment throughout at the demand of part of the molders, the plant is tied up and about 100 men are idle. The company has conducted an open shop.

Personal

A. H. Tait, formerly with the Abendroth & Root Mfg. Company, has connected himself with George A. Low, 24 State street, New York, who is export manager for the Remington Oil Engine Company, Stamford, Conn.; E. C. Bradford Belting Company, Cincinnati, Ohio; Ohio Valley Pulley Works, Maryville, Ky.; American Steam Pump Company, Battle Creek, Mich., and other manufacturers. Mr. Tait will sail March 4 on a selling trip to the Orient, Australasia, India and Egypt.

Col. Robert C. McKinney, president of the Niles-Bement-Pond Company, New York, sailed February 18 for Egypt, where he will spend a four months' vacation.

At the annual meeting of Manning, Maxwell & Moore, Inc., New York, held February 14, Charles A. Moore, Jr., and J. B. Brady resigned as vice-presidents, and W. O. Jacquette and R. A. Bole were elected to succeed them. C. M. Chester, Jr., was re-elected treasurer, and he will assume the additional office of secretary, formerly held by Charles A. Moore, Jr. With the exception of Mr. Moore, the directors of the company were re-elected.

Sterling H. Bunnell has resigned as works manager of the Griscom-Spencer Company, to open a consulting engineering office at 90 West street, New York, as a specialist in factory system. Mr. Bunnell is the author of "Cost Accounting for Manufacturing Plants," now in press by D. Appleton & Co. as one of their "Business Series." He is a member of the American Society of Mechanical Engineers and of the American Gas Institute. Graduating from the Sheffield Scientific School of Yale University in 1891, he has held positions with corporations manufacturing woodworking machinery, steam and gas engines and refrigerating machinery. As works manager for several plants he has installed cost keeping systems, and in the past four years, with the Griscom-Spencer Company, he has reorganized its shop system and superintended the construction of engineering work. Mr. Bunnell has been retained by Clinton H. Scovill & Co., Boston and Chicago, to take charge of their cost keeping and factory efficiency branches.

B. G. Harrison, London, England, representing Sota & Aznar, Spanish iron ore producers, who has been in the United States for several weeks in connection with the marketing of iron ore, will return home this week.

William S. Pilling of Pilling & Crane, Philadelphia, Pa., and B. F. Fackenthal of the Thomas Iron Company, Easton, Pa., will leave February 25 for a month's trip, visiting New Orleans, southern California and Colorado.

C. E. Beritie, with the sales department of Rogers, Brown & Co. in the Philadelphia district, has resigned and will become associated with the Roanoke Gas & Water Company, Roanoke, Va.

Dr. Edmund A. Engler has resigned the presidency of the Worcester Polytechnic Institute, Worcester, Mass., to take effect at the end of the present academic year. He has been at the head of this well-known engineering school for 10 years.

Fred H. Daniels, general engineer of the American Steel & Wire Company, has been made chairman of the Shop Committee of the Board of Trustees of the Worcester Polytechnic Institute, Worcester, Mass., taking the place occupied for many years by the late Charles H. Morgan.

Charles M. Schwab has returned from a six weeks' trip to Europe.

Chairman John A. Topping of the Republic Iron & Steel Company has gone to Florida for a stay of a few weeks.

Edwin S. Mills, special agent of the Carnegie Steel Company at Chicago, sailed for Europe February 18, accompanied by Mrs. Mills.

Wm. McLauchlan of Pickands, Mather & Co., Cleveland, is spending several weeks in California.

Frank Koester, previously with the Interborough Rapid Transit Construction Company (New York subway), J. G. White & Co., Guggenheim Exploration Company and American Smelting & Refining Company, has opened an office at 115 Broadway, New York, as consulting engineer. Mr. Koester is the author of "Steam Electric Power Plants" and "Hydroelectric Developments and Engineering."

Frank W. T. Amis, who has been New York representative of Pilling & Crane, Philadelphia, for several years, continues to handle the sale of coal for New Jersey, New York and New England, E. B. Blandy, as already announced in these columns, having charge of pig iron sales.

John Trix, president of the American Injector Company, Detroit, Mich., has gone to Cuba for a stay of several weeks. He will visit the Panama Canal before returning.

L. T. Wilmarth, president of the Wilmarth & Morman Company, Grand Rapids, Mich., left last week for Los Angeles, Cal., to be gone until April 1.

George G. Crawford, president of the Tennessee Coal, Iron & Railroad Company and Mrs. Crawford sailed on the Berlin February 18 for a Mediterranean trip.

J. B. Rider, general manager of the Pressed Steel Car Company, Pittsburgh, has returned from a month's visit to Bermuda.

N. P. Hyndman, sales manager of the Washington Coal & Coke Company, Pittsburgh, has returned from an extended visit to the Pacific Coast.

W. P. Snyder, president of the Shenango Furnace Company, Pittsburgh, is at Palm Beach, Fla.

Obituary

RICHARD C. BRANCH, vice-president of the Branch Saw Works, St. Louis, died February 17, of pneumonia, at the Minor Hospital in Seattle, Wash., after a short illness. He was on a business trip to the Pacific Coast. He was born at Dorchester, England, in 1871, where his parents were visiting, and was the second son of the late Joseph W. Branch, who, before he established the Branch Saw Works, was the first St. Louis representative of Wm. Jessop & Sons. Since his father's death Mr. Branch had been the manager of the business. He is survived by his brother, Joseph P. Branch, president of the company.

MARTIN J. HOGAN, president and treasurer of the Engine & Machinery Company, Canton, Ohio, died February 11, aged 56 years.

LEROY S. WHITE, Waterbury, Conn., president of the Electrical Appliance Mfg. Company, and well known as an inventor, died suddenly February 17, aged 82 years. A native of Waterbury, his father died when he was four years old and he was bound out to a farmer. At the age of nine he went to work in a cotton mill at Chicopee, rising to the office of room superintendent. He was later employed at die sinking for the Ames Mfg. Company, Chicopee, and in 1855 moved to Hartford, Conn., entering the factory of the Hartford Mfg. Company, where he invented what is said to have been the first successful machine for burnishing silver plated ware. Moving to Waterbury in 1858 he was associated with Rogers & Bros. and later with Brown & Bros. He leaves a widow and three children.

SAMUEL H. MOORE, for a number of years connected with foundry operations in Milwaukee, died at Cleveland February 8, aged 89 years. He was the father of E. Y. and V. M. Moore of the Chisholm & Moore Mfg. Company, Cleveland. In 1873 he founded the firm of S. H. & E. Y. Moore, manufacturers of heavy hardware, in Chicago. In 1888 he removed to Milwaukee, where he and his two sons established the Moore Mfg. & Foundry Company. He removed to Cleveland in 1894, when his sons and others established the Chisholm & Moore Mfg. Company.

WM. KENNEDY FLEMING, who for seven years has been secretary to Chairman E. H. Gary of the United States Steel Corporation, died of pneumonia, at East Orange, N. J., February 17, aged 46 years. He was born at Brantford, Ont., graduated at Harvard University, and spent much of his life in Denver and Washington. He leaves a widow and two sons.

The Crucible Steel Company Further Strengthens Its Position

The present progressive management of the Crucible Steel Company of America, Pittsburgh, which recently took over the plant of the Midland Steel Company, has made another purchase, which will still further strengthen its position in the direction of making its own raw material and controlling its own supply of fuel. On the site which was formerly the property of the Midland Steel Company, at Midland, Pa., the Crucible Steel Company is now planning to build an open hearth plant of sufficient capacity to take care of its increasing demand for open hearth steels of the higher qualities, which demand cannot be met in ordinary times because of the impossibility of the company securing additional lands adjacent to its Park Works in Pittsburgh, where extensions would otherwise be made. The company proposes to add a large Heroult electric steel furnace at Midland to improve still further the quality of its open hearth product.

Directly across the Ohio River from this new acquisition a virgin acreage of steam coal capable of being cheaply transported by aerial means direct to the works has also been secured, thus providing for a constant supply of cheap fuel, guaranteeing protection against interruptions from high water or other causes. In addition to this the company has concluded a purchase of coal lands that will give it an adequate supply of coal for coking purposes to supply its needs for many years. It has bought some 2000 acres of the best low phosphorus and low sulphur extension of the thick vein Connellsville coking coal, lying in one block above Lock No. 6 on the Monongahela River, and close to the dividing line between Washington and Green counties. This vein is of the usual 7½ to 8 ft. thickness, and the purchase is estimated to contain from 25,000,000 to 30,000,000 tons of coal, a supply large enough to produce sufficient fuel for all of the steel plants of the company and for making coke for its blast furnace for more than 25 years. Engineers are already on the ground, planning the developing of the property, locating shafts, tipple, houses, &c., so that, at the earliest possible date, active operations may be commenced, coal mined and the whole property actively worked. It is proposed to ship the coal in lumps for the mills and in crushed coal for the coke ovens by river craft, so that the entire fuel to be consumed by the company will soon be produced from its own property. The deal was made by J. H. Hillman & Son, Oliver Building, Pittsburgh, dealers in pig iron, coke, ore and coal lands.

The Garland Corporation, Pittsburgh, showed the largest net earnings in its history in 1910, reporting $354,727. This compares with $297,433 in 1909 and an average of $216,742 per annum for the five years ending December 31, 1908. After allowing for $90,000 interest on the $1,500,000 bonds outstanding, the 1910 balance of $264,727 is equivalent to 10.85 per cent. on the $2,439,600 stock outstanding. The corporation materially strengthened its financial and statistical position during the year. The surplus is $3,461,023, an increase of $334,730.

Among the orders recently filled by the Reeves Pulley Company, Columbus, Ind., was one for a carload of pulleys to Valparaiso, Chili, and others to Monterey and Vera Cruz, Mexico, and to South Africa. Two large variable speed transmission machines have been shipped to a paper mill in Italy and another to Germany. Fourteen machines have gone to Denmark within the last few days and others to London. The company reports more speed transmissions sold in January than in any one month in five years.

The Macomber & Whyte Rope Company, Chicago, wire rope manufacturer, with plants at Fostoria, Ohio, and Coal City, Ill., is negotiating with several cities with a view to consolidating its two plants at one point. Among the cities under consideration is Waukegan, Ill.

Ganschow Cut Gear Exhibition

An interesting exhibition of the manufacture of raw hide and cut gears was made on the evening of February 18 at the plant of the William Ganschow Company, 1001 Washington boulevard, Chicago. Invitations were extended to all the shops in the Chicago district, members of the National Metal Trades Association, and also to all other concerns that had at any time purchased the Ganschow product. Foremen machinists and shop superintendents were particularly invited, but there were also present many of the executive heads and buyers of the firms with which these men are connected.

The Ganschow Company specializes in the manufacture of cut gears, and its large plant is equipped throughout with modern automatic machines. About 200 visitors availed themselves of the opportunity to see these machines in operation. There were also present, to explain the working of the tools, representatives of the makers, including Henry Buker and associates, of the Brown & Sharpe Mfg. Company; Stanley H. Fox, Gleason Works, Rochester, N. Y.; Alfred Marshall, Marshall & Huschart Machinery Company, Chicago; Gould & Eberhardt, Newark, N. J.; Lodge & Shipley Machine Tool Company, Cincinnati; Warner & Swasey Company, Cleveland, and others.

Red Cut Superior high speed tool steel made by the Vanadium-Alloys Steel Company, Latrobe, Pa., was used on the machines during the demonstration. P. W. Bigger, manager of the Chicago district for McKenna Brothers, Pittsburgh, agents for this company, was also present. S. M. Cantrovitz, Western Raw Hide & Belting Company, Milwaukee, gave a talk on the development and manufacture of the raw hide pinion from the hide to the gear blank, and William Ganschow finished the lecture, detailing the operation from this stage of production to the completed gear. The demonstration was entirely successful from every standpoint, the educational feature of the lecture being the foremost thought in the minds of the hosts. Refreshments were served during the evening.

The William Ganschow Company was founded in 1871 by the father of the present heads of the business, William and Ernest Ganschow. This company enjoys the distinction of probably being the first firm in the West, if not in the United States, to engage exclusively in the manufacture of cut gears. The plant has been greatly enlarged since the founder's death, and is now equipped to cut gears from the smallest up to 14 ft. in diameter.

The Lackawanna Steel Company's New York office has been removed to room 1826, at 2 Rector street, from the former quarters at 1814 in the same building. The New York office is now devoted principally to district sales matters since the removal of the general offices to the company's plant at Lackawanna City, near Buffalo, and is in charge of H. H. Barbour, district sales agent. A number of other departments are, however, still represented at the New York office.

The Mesta Machine Company, Pittsburgh, works at West Homestead, Pa., reports a considerable increase in orders, and it has added more men to its working force. The company has received a contract from the Algoma Steel Company, Sault Ste. Marie, Ontario, Canada, for a vertical blowing engine, 46 x 84 x 60 in., and has also received a contract from the Sharon Steel Hoop Company, Sharon, Pa., for a 57-in. type B Helander barometric condenser, together with a 12 x 20 x 16 in. dry air pump.

The American Rotary Valve Company, recently incorporated with $500,000 capital stock, will establish its headquarters in the Borden Building, 56 Dearborn street, Chicago. The company will manufacture vacuum cleaners and a rotary valve, and is contemplating the erection of a factory in the vicinity of Chicago. William Waller, Sr., is president; D. Smith, vice-president; Austin H. Heart, secretary; Warren C. Fairbanks, treasurer, and William Waller, Jr., assistant treasurer.

Storage Batteries*

Their Use for Electroplating

BY GEO. M. HOWARD.†

The electroplater utilizes a current of electricity to bring about certain chemical or electrochemical reactions, which consist in the dissolving of metal from the anode and the depositing of the same metal upon the cathode. In any battery, primary or secondary, the action is the reverse of this. The chemical reactions taking place between the electrolyte and the two electrodes respectively cause a difference of elctrical potential between the poles, so that when these are connected by a metallic circuit outside of the solution a current of electricity will flow.

The Action of the Plating Bath

In a plating bath the anode, or positive pole, is made of the metal to be deposited, and the solution must be so constituted that the anode will dissolve in it only under the action of the current, thus replacing the metal deposited and keeping the bath constant. Practically all primary batteries have this in common with the plating bath, that one of the electrodes goes into solution. An illustration of this is the zinc in an ordinary Leclanche or a gravity cell. A primary cell when exhausted cannot be restored except by the replacing of the exhausted element—either the solution, or one of the electrodes, as the case may be. To restore a secondary or storage cell, however, it is only necessary to pass through it a current from some outside source in the reverse direction to that given by the cell. One of the chief requisites for this characteristic of reversibility is the comparative insolubility of both electrodes in the solution under all conditions of charge and discharge, and it is in this respect particularly that the storage cell differs from both the primary cell and the plating bath.

The Lead Storage Cell

The active elements of a lead storage cell are peroxide of lead for the positive plate and spongy metallic lead for the negative in an electrolyte of dilute sulphuric acid. The "active materials" have to be supported, and the plates are therefore either constructed with grids, which hold the material in place, or else are made with a sufficient core of solid lead to give the necessary strength.

Upon discharge a portion of the lead peroxide and spongy lead unites with sulphuric acid from the electrolyte, forming lead sulphate on both plates. The lead sulphate, being practically insoluble, remains on the plates, and is very readily brought back to peroxide and metallic lead, respectively, upon charging. Thus it is seen that the storing consists merely in bringing about certain chemical reactions by means of an electric current, and that the reverse reactions taking place on discharge produce the secondary current.

The voltage of the lead storage battery on discharging is considerably higher than that of other cells, either primary or secondary, averaging close to two volts at moderate rates. On the other hand, the very low internal resistance makes it possible to draw very large currents if desired.

A Constant Current Necessary in Plating

Coming now to the application to plating, every one who has had experience knows how important it is to maintain a constant current in order to secure uniform deposits. Low voltage dynamos, whether shaft or motor driven, are subject to considerable fluctuation. The steady voltage of the lead battery makes it peculiarly suited to maintaining constant current. When batteries are used, not only will the deposit be more uniform than with machine plating, but it becomes possible to regulate the depth of deposit much more accurately by the ampere hours used. An instance of the value of the latter feature is found in the experience of a company doing a very large amount of silver plating. When doing the work from generators, there was always an excess of silver deposited owing to the impossibility of accurately controlling the current. The company installed large storage batteries, and the one item of cutting down the overweight saved enough money to pay for the battery in a year and a half.

In figuring on the proper capacity of battery to install it is advisable to allow a considerable margin. This is not only for the purpose of having a reserve, but also on account of the voltage characteristic. When a fully charged cell is put into discharge, the voltage starts considerably above 2 volts and falls almost immediately to about 2 volts where it holds nearly constant until toward the end of the discharge, when it begins to fall more rapidly. Thus it is seen that there is a flat portion of the discharge curve where the voltage is quite constant, and in order to get the full benefit of this in steady output without regulation, it is necessary to use batteries of such capacity that they will never be fully discharged.

How to Use Storage Batteries to Advantage

There are two systems by which storage batteries can be used to advantage. The first is to use them as a regulator for the dynamos and an auxiliary, so as to permit of 24-hour working without running the machine constantly. In this system during the day the battery is connected across the line from the generator to the plating circuits, taking current until it is charged, and then merely "floating," as it is called. While floating, the battery is alternately charging and discharging for short periods, as the voltage of the generator varies, and takes the fluctuations which would otherwise affect the working circuits. It is also valuable as a reserve, preventing interruptions in the work in case of a shutdown of the machine for any cause. When the system described above is used it is necessary at intervals of once every two weeks to raise the voltage of the generator and give the battery what is called an "overcharge."

The second method, which is unquestionably better, is to have two batteries used alternately, one charging while the other is discharging, and do all the plating from the batteries alone, using the generator only for charging. This gives all the advantages derived from the constant current and the ability to run uninterruptedly as well.

The Care of a Storage Battery

It is a well known psychological principle that idleness begets laziness—that the less a man has to do the more unwilling is he to do anything at all; and from this characteristic of human nature the storage battery suffers. The fact that it requires so little attention is apt to create a feeling that it requires none whatever. This feeling is fostered by the fact that a battery will continue for some time to work satisfactorily under abuse or neglect without showing signs of trouble to a casual observer; but the damage is being done all the same, and in the end the penalty must be paid.

Almost any kind of machinery will give danger signals—there will be a squeak or a knock or some other warning. Not so with a battery. The warning is there, but it must be looked for and will not obtrude itself. Hence the necessity for systematic inspection and careful operation. It is really surprising how little attention is necessary, providing only that it be systematic. I have often heard one of the pioneers in storage battery work say that if men were only willing to give one-tenth of the attention to their batteries that they give without question to engines, for instance, there would be an end of battery troubles. There is, perhaps, no case where the old adage, "an ounce of prevention is worth a pound of cure," more aptly applies.

The cardinal principles of operation may be briefly summarized as follows:

Do not allow the battery to discharge below the safe limit. This will be about 1.8 volts per cell at the low rates usually employed in plating work. If the battery has been proportioned

* Address before the National Electroplaters' Association, New York, February 11.

† Chief chemist Electric Storage Battery Company, Philadelphia, Pa.

to the work as recommended above, this warning becomes unnecessary.

As far as possible, maintain a regular schedule for changing the battery.

Do not overcharge excessively.

Add pure water to the cells often enough to prevent the plates from being uncovered by evaporation. The best time to add water is just before an overcharge, so that the gassing will cause it to mix with the electrolyte.

Carefully inspect all cells at least once in two weeks, preferably just before the overcharge.

Remove the sediment from the jars when within ½ in. of the plates.

Have good ventilation during the charge, and never bring an exposed flame near a charging battery.

Never allow metals or impurities of any kind to get into the cells.

The Diversified Uses to Which Storage Batteries Are Put

Most people are now familiar with their use for running electric automobiles and for ignition and lighting on gasoline bars; but few realize the extent to which they are used in large work, as, for instance, by the public service corporations. To take a local illustration, the New York Edison Company, which furnishes most of the electric lighting in this city, has no less than 44 storage battery installations, having a total capacity of 33,000,000 ampere hours at the eight-hour discharge rate. In Brooklyn there are 11 of these large lighting batteries. Large office buildings and hotels which have their own lighting plants nearly always include a battery as part of their equipment.

Many trolley lines use batteries as a regulator for their load, and as a reserve to help out the generators at times of heavy traffic.

The New York Central Railroad, in connection with its suburban electrification, has very large batteries installed.

The large steel companies are now adopting them for regulating the load in their works, the model plant at Gary, Ind., having a very large installation.

Coming to some of the smaller applications, the telegraph and telephone companies use storage batteries almost exclusively in their work. Nearly all of the new railroad coaches are electrically lighted by means of storage batteries, and none but electrically lighted cars are permitted to run through the new Pennsylvania tunnels on account of the danger from fire with other systems. The electric locomotives which haul these tunnel trains are controlled by means of storage batteries. The modern railroad signal systems are largely operated by storage batteries, one road alone having upward of 30,000 cells in use for this purpose.

A comparatively recent application in which the separate plants are small, but which is growing to very large proportions in the aggregate, is for small isolated lighting plants, in conjunction with a gas engine and dynamo. Since the introduction of the low voltage tungsten lamps, with their small energy consumption, such a plant can be installed for so moderate an outlay that even many small farmers are able to enjoy the well-known advantages of electric lighting.

In closing, I would urge those of you who are not using storage batteries for your plating to study the benefits to be derived from their use, and I feel sure you will be amply repaid. The fact of your work being done at so low a voltage and with comparatively low current rates makes the investment necessary usually a small item—a consideration which should make the proposition all the more attractive.

President Taft on February 15 performed the last act necessary on the part of the United States Government to assure the Panama Canal Exposition to San Francisco, when he signed the bill inviting foreign nations to participate in such an exposition to be held in San Francisco in 1915. The President signed the bill with a pen made from California gold.

Post & McCord, New York, are furnishing and erecting the steel work for a building for the Bankers' Trust Company, at the corner of Wall and Nassau streets, which will be 46 stories high above the street. The steel, of which about 8000 tons will be used, was fabricated by the American Bridge Company.

The Pressed Steel Car Company's Year

The business of the Pressed Steel Car Company in the year ending December 31, 1910, was much larger than that of the previous year. The income account for the year compares as follows:

Income Account

	1910.	1909.
Gross sales	$27,975,978	$10,346,816
Net earnings from operation	$1,697,495	.....
Other income	150,870	.....
Total income	$1,848,366	*$1,954,583
Depreciation	280,000	120,000
Balance	$1,568,366	$1,834,583
Preferred dividends	875,000	875,000
Surplus	$693,366	$959,583
Previous surplus	6,653,639	5,694,057
Total surplus	$7,347,005	$6,653,640

* Includes $1,200,000 cash received from sale of Canada Car Company common stock, which had no value placed upon it on the company's books.

Balance Sheet

The general balance sheet, as of December 31, compares as follows:

Assets.	1910.	1909.
Property and franchises	$26,840,665	$27,054,968
Securities	2,785,095	1,951,740
Taxes and insurance not accrued	7,796	23,546
Accounts received	3,252,966	2,157,671
Inventory	640,799	2,842,075
Cash	1,610,819	987,360
Totals	$35,138,140	$35,017,360
Liabilities.		
Common stock	$12,500,000	$12,500,000
Preferred stock	12,500,000	12,500,000
First mortgage notes	500,000	500,000
Purchase money mortgages	75,000	75,000
Accounts and bills payable	1,062,087	1,639,361
Accrued wages	124,674	141,926
Preferred dividends	218,750	218,750
Accrued interest	10,623	10,623
Contingent reserve	800,000	778,060
Profit and loss surplus	7,347,005	6,653,640
Totals	$35,138,140	$35,017,360

President F. N. Hoffstot says, in part:

"The best works operations were from April 1 to December 1, during which period the lowest operating cost in the history of the company was maintained. Dull periods such as this company is now experiencing are quite difficult to contend with, as sellers of raw materials endeavor to maintain prices, and buyers of equipment expect reductions, so that the slack in the car business has to be taken up largely by the manufacturers.

"The usual policy to develop improved methods and facilities for the economic manufacture of cars has been continued, and the company is in position to build cars at the lowest costs, and, therefore, should receive its full share of business when cars are offered. It is, however, quite difficult to predict the business prospects for the year 1911. There were at the opening of the year a number of inquiries, but the competition for business is keen, particularly as manufacturers are actuated by a desire to hold their organizations together in the hopes of a permanent improvement in business.

"There were about 25 per cent. less cars ordered in 1910 that in 1909, and even the orders placed during 1909 were much less than the average annual rated car requirements. In addition, there has been a contraction in the efficiency of car equipment, due largely to idleness, but in some cases failure in up-keep, and it is, therefore, reasonable to expect an average (and perhaps increased) volume of business will be offered during the year 1911, unless some further business disturbance occurs.

"The passenger car department turned out 100 per cent. more business last year than in 1909, and continues to contribute profits, although the margins in this class of business are small. The plants are in good condition. The McKees Rocks plant is still in full operation, but the Allegheny plant was closed down November last. During the year $304,301 was expended on improvements and betterments, which amount was about equally divided between the McKees Rocks and Allegheny works."

Railroad Efficiency and the Labor Unions

An Irreconcilable Conflict Between Scientific Management and the Closed Shop

BY "EFFICIENCY."

Since the recent hearings before the Interstate Commerce Commission, wherein the railroads operating in the territory north of the Ohio River and east of the Mississippi River have attempted to show the necessity for increases in their charges, a great deal of newspaper and magazine space has been utilized in an effort to tell the railroads how to manage their business. Through these articles such high sounding terms as "efficiency systems" and "scientific management" are becoming household by-words, and, no doubt, those who have read have learned much—in some instances not so much. In particular they have not learned much about the railroads and the manner in which they are bound hand and foot in the meshes of both the open and the closed shop labor unions.

The labor problem, with its manifold ramifications, is one of which magazine writers and many of the clergy and our educators, who write and speak freely on it, have little practical knowledge. In fact, to those dealing daily with some phase of this problem as employers, it would appear that these theorists and altruists had steered as clear of the real subject as possible, and when perchance they have picked it up they have immediately dropped it as one might dispose of the proverbially hot brick.

In dealing with organized labor the managements of the railroads of our country find themselves between the upper and the nether millstones. Their policy of continued conciliation in the treatment of the demands of their organized employees and the recognition of the unions of these workmen has finally brought them to a point where they are compelled to fight every inch of their ground to maintain the slightest semblance of managerial control.

Open Shop and Closed Shop Unions

There are to-day two classes of labor unions among railroad employees. First and foremost are the Brotherhood of Locomotive Engineers, the Order of Railway Conductors and the Brotherhood of Locomotive Firemen and Enginemen. These are what may be termed "open shop" organizations. The second class, and the most difficult to deal with, are the unions of machinists, iron molders, boilermakers, blacksmiths and patternmakers.

The policies of these two classes of unions have not been explained in the many articles lately appearing on the probable obstacles organized labor might put in the way of the railroads in their attempts to introduce certain systems for increasing efficiency. The three organizations named in the first class are commonly known as the "railroad brotherhoods." They are composed of an unusually high grade of workmen, of high moral character, broad minded, and with an eye not alone to their own welfare. They appreciate the necessity of the employer maintaining some rights in the management of his business. They have in many ways assisted in making the railroads what they are in the matter of efficient traffic arrangements and in adding materially to the comfort of the traveling public. Unlike the second class of labor organizations, their membership is selected solely because of its competence, without the slightest regard for mere increase in the numerical strength of the brotherhood. The requirements for initiation are severe and those for the retention of membership are even more so.

Members of the Brotherhood of Locomotive Engineers are credited with never having refused to work with engineers not members of the organization. An engineer may become a member or not, as he chooses, and a new engineer is given some time in which to decide upon joining. In the interim the brotherhood protects his interests as though he were already a member. This brotherhood is rated to-day as the strongest union of American workmen. Unquestionably it is the wealthiest. Warren S. Stone, grand chief of the engineers, is quoted as saying:

> I do not believe in forcing men to join a union. If a man wants to join, all right; but it is contrary to the constitution and the principles of free government to try to make him join. We of the engineers work willingly side by side with other engineers who do not belong to our union, although they enjoy without any objection on our part the advantages we have obtained.

When we come to deal with the second class of labor unions the members of which find employment in the repair and other shops of the railroads, we find a totally divergent class, organized upon principles widely different from those of the railroad brotherhoods. They are the "closed shops" unions. The railroad brotherhoods are the "open shop" unions. The closed shop unions of machinists, iron molders, blacksmiths, and the like, insist that none but their members shall be given employment in shops controlled by them. They are allied with the American Federation of Labor, which in many ways has shown its antagonism to the railroad brotherhoods because the latter have steadfastly declined to become affiliated with the Federation.

Both the closed shop and open shop unions are opposed to the introduction in the railroad shops of efficiency systems or principles of scientific management. The policies of the closed shop unions are still permeated with the must of antiquity, and probably will continue to be until an indignant public sentiment compels a change.

Unions Against Efficiency Systems

In an article on "Efficiency, Freight Rates and Tariff Revision" in the *Review of Reviews* for January, Benjamin Baker says:

> One hasty and misleading attack on scientific management that should be "nailed" is the assertion that organized labor stands in the way. In the actual experience of those who testified at the hearings in Washington this has not been the case. Mr. Gilbreth, who has done construction work under the scientific system in such a labor stronghold as San Francisco, said that he dealt by preference with unions and union men. . . . The primary object of the labor unions is to get work for all its members, and to secure for them a minimum daily wage. . . . No union could stand the strain of opposing a maximum wage that is within the reach of every member.

Mr. Baker says these hasty and misleading attacks should be "nailed." I rather think Mr. Baker is the one who should be "nailed." He mentions the experience of Mr. Gilbreth, the contractor, with the bricklayers in San Francisco. Mr. Gilbreth says he has dealt with union labor because of a preference. This may be a correct inference from the testimony of Mr. Gilbreth, but it is well to point out that in San Francisco Mr. Gilbreth could not have used nonunion labor on buildings even if he had so desired. Furthermore on all construction work outside of San Francisco, except in isolated sections, the workmen in crafts employed by builders are so thoroughly organized that there is no question of preference. The language used by Mr. Gilbreth quite possibly was dictated by diplomatic considerations for which, from a business standpoint, he should not be taken to task. In addition to this it is well known that the bricklayers' union is accustomed to limiting the speed at which bricks shall be laid in a wall by placing at the ends the slowest workmen, knowing full well that the center cannot rise with more celerity than the extremities.

Here we see the efficiency of the union bricklayer

regulated entirely by the ability of the incompetent or the laggard. Not only is the efficiency limited, but likewise the earning power of the man wherever piecework or bonus systems are in vogue.

What "Conciliation" Means Practically

The predicament in which building contractors at present find themselves in their efforts to secure a higher efficiency from their workmen is due largely to the same policies adopted in past years by the railroads. Both railroads and builders have, to some extent, acted in concert in meeting the demands of organized labor among their respective employees, but always on the so-called conciliation basis, which can be interpreted in no other way than a "splitting of the difference" when adjustments are concluded. As a natural consequence in these cases, as well as in all others treated by employers in a similar manner, the unions have pursued the practice of demanding double what they expected to receive and trusting to conciliation to secure what they really were after. This is notoriously the situation in the stove foundry industry, even though this product is one depending almost entirely upon workmen for its market.

The cause of this will be found in the unpreparedness of building contractors, railroads or stove founders, through lack of sufficiently comprehensive or aggressive organization, to handle a strike in the event of the failure of conciliation. Little by little the unions employed in these lines have gained on the employers until the comparison of efficiency with unorganized workmen in other crafts shows a shameful disparity.

Efficiency vs. Limitation of Output

"The primary object of the labor union is to get work for all its members and to secure for them a minimum daily wage," says Mr. Baker in arguing that these unions will not oppose the efficiency system. This statement applies with deadly accuracy to the principles of the closed shop labor union, but the conclusions are erroneous. The primary object of these unions, being to secure work for the entire membership, constitutes the very essence of their argument against the efficiency system. Their claim is that the efficiency system will so conclusively expose the "limitation of output"—one of the fundamental principles of the closed shop union—and so increase the product of the plant in which it may be installed that the manufacturer will readily conclude that he can get along with a less number of workmen, even though he may be compelled to pay larger wages to those whom he may retain. Mr. Baker might well read the official journals of the International Association of Machinists and the International Iron Molders' Union if he would know of the antagonism of these particular labor organizations to the efficiency system or to the principles of scientific management.

A short quotation from the report of one of the vice-presidents of the International Association of Machinists, printed in the January, 1911, issue of the *Journal* of that organization, will serve to indicate the attitude of officials of the machinists' union toward the efficiency system. Reference is here made to the hearings before the Interstate Commerce Commission, and the conclusion follows:

> Mr. Brandeis made some remarkable statements before the Commission, charging managers of railroads and those responsible for conducting the operation of traffic with great waste, and to prove his contention submitted figures and the testimony of experts to show how mechanical repairs could be made at a great saving. The Santa Fé's method of production was cited as an evidence. Our readers must not forget that Mr. Brandeis' audience was made up largely of all the influential railroad men of the country, and those familiar with the Santa Fé's method of production must know that it is nothing more or less than what is commonly known as the "Emerson Standard Time System," a bonus system or premium system of the most extreme type. To those who may want to know something of the workings of standard time, which Mr. Brandeis urges the railroad managers of the country to adopt, I will respectfully refer them to an extract of a speech delivered before the Pittsburgh Railroad Club by your humble servant on February 25, 1910, and published in the April, 1910, issue of the *Machinists' Journal*, pages 341 and 342. This will give the railroad machinists of our Western States an idea of what they are up against if the advice of Mr. Brandeis is taken seriously. . . . I believe our members should know what is going on so as to be forewarned against the introduction of methods of production that will relieve the shippers at their (union machinists') expense alone.

Those manufacturers who have had a wide and varied—many of them a most unpleasant—experience in dealing with the closed shop labor union will hardly agree with the statement of Mr. Baker that "no union could stand the strain of opposing a maximum wage that is within the reach of every member." The International Molders' Union has withstood this strain for more than 50 years. The International Association of Machinists has withstood it since its birth. Both organizations are unalterably opposed to piece work or bonus systems of any kind, and the efficiency system can be classified under no other head, although the name be a softer one and less calculated to provoke antagonism among the ignorant.

Union Leaders Against "Efficiency"

The latest, and by all odds the most emphatic, assertion of labor union officials that they were opposed to these efficiency systems was made as recently as January 12 at the annual meeting of the National Civic Federation in New York. The two foremost advocates of the efficiency system presented to this convention most carefully prepared papers. No sooner had they taken their seats than the dogs of war were turned loose upon them and their systems were literally riddled by representatives both of the open and closed shop unions. Furthermore, these efficiency engineers were given scant courtesy by the convention. The chairman, Oscar Straus, adjourned the meeting immediately after the unionists had concluded their attack and the engineers were compelled to content themselves with coming out second best, because they were denied an opportunity to defend themselves and their systems. The entire proceedings seemed to smack very much of a well laid trap for the efficiency system, and its advocates were completely snared.

The first union official to deliver his tirade against scientific management was none other than Grand Chief Warren S. Stone of the open shop union, the Brotherhood of Locomotive Engineers. Mr. Stone did not mince his statements; there was no possibility of misunderstanding him. He came out in flat-footed fashion and said that not only was he opposed to these efficiency systems, but that the organization which he had the honor to represent would oppose their introduction to the limit of its ability. Mr. Stone characterized the present propaganda and scientific management agitation as nothing less and nothing more than the old-fashioned piece work, bonus and premium systems, against which the labor unions had been fighting all their lives, and which they would continue to oppose. John Mitchell, late president of the United Mine Workers, but now an employee of the Civic Federation, followed Mr. Stone and spoke for the closed shop unions. The unions which he represented were unqualifiedly opposed to any and all of these systems. Mitchell closed his remarks with the statement that before any of these systems could be introduced into shops where the unions had anything to say they would have to be consulted.

If doubt ever existed as to the policy of the unions of labor, both open and closed shop organizations, as to their treatment of an attempt to introduce the efficiency system, there need be none now, and even our good friend Dr. Abbott need not express any further surprise at the unearthing of this appalling truth.

Railroad Shops Closed Against Efficiency Methods

When we come to consider the railroads and the closed shop unions let us bear in mind that 56 railroads in the United States are reported as having entered into iron clad written agreements with the International Association of Machinists in 1910 to operate in accordance with the rules and regulations of this union. Railroads and breweries are the most extensive contractors with this and other metal trade unions. Written agreements by machine shops and foundries in other lines with union machinists and union iron molders are the exception. By far the greater majority of these shops are operated

free from the dictation of these unions, and it is in these shops that the efficiency and scientific management systems have had their most pronounced success.

The effect of union opposition to these efficiency systems has actually become so pronounced, and such indifferent success has been encountered by at least one firm of efficiency engineers in plants either partly or wholly under control of the labor organizations, that the advisability of even soliciting these plants for business is seriously doubted.

It is pointed out by this particular firm of engineers that a company which is unwilling or unable, because of union opposition, to insist upon the adoption of the full and complete recommendations of the efficiency engineers will impair the practicability of the system. These union shops, in all probability, will be eliminated by the efficiency engineers from the category of "good business" until such time as the unions may be dislodged.

Restrictions of Metal Working Unions

Let us now glance over the provisions contained in some of the agreements which the railroads have made with the union of machinists. The same restrictions will apply where the railroads are operating union foundries. Railroads are not known as extensive operators of foundries, but where making their own castings it is generally under the dictation of the International Iron Molders' Union, although formal, written agreements are not so prevalent between railroads and this union. The restrictions insisted upon in the union machine shops and foundries are as follows:

Arbitrary limitations of the output of the individual workman. If a union machinist or molder performs more work in a given time than specified by his organization, charges are preferred against him for "killing the job," and if found guilty he is fined. This fine must be paid before he may return to work in a union shop. By this means the energy, ability and inclination of the workman are completely curbed.

Arbitrary limitation of the employment of apprentices to one for the shop and one to five journeymen machinists or molders.

Machinists working three hours and twenty minutes or less on railroads on special work shall be paid for not less than five hours' work.

If a union machinist is delegated by his organization to take up a grievance with the management of the road, he shall be granted the requisite leave of absence and free transportation.

Helpers and laborers shall not be permitted to do machinists' work, and no man shall be classed as a machinist until he receives the minimum wage. This constitutes one of the fundamental principles of the "closed shop," and prevents the use of helpers and laborers at a less, though commensurate, rate of wages on lower grades of work.

Union shop committee to be consulted when machinists are discharged for cause, if objection is made.

None but union machinists and molders shall be employed.

No piece work; no premium work; no bonus systems.

Arbitrary insistence upon a minimum wage rate.

The inexperienced student who seeks to investigate the aims and purposes of these unions will not find these inimical provisions in published records. Another set of principles is usually handed out. They deal in such well-meaning and high-sounding terms as "bringing within the folds of our association every machinist who is actively engaged in the trade"; "believing it to be the natural right of those who toil to enjoy to the fullest extent the wealth created by their labor"; and "with a view to restore the common weal of our government to the people."

That leaks exist in railroad management there can be no doubt. Until these unions of labor are dislodged, however, there will be no efficiency systems installed. Abundant proof of this is available on every side. Some more appropriate system must be devised. Scientific management is not necessarily of the same family as the efficiency system, for it may be successfully utilized in many ways for the prevention of leaks. A more perfect cooperation between division superintendents and master mechanics, coupled with the adoption of the policies of many of our large industrial concerns would aid in stopping waste on our railroads. Let us utilize the material already available before clutching at some new fangled scheme merely because it possesses a catchy name.

Our Immigrant Workmen

The Large Numbers Employed in Car and Locomotive Works, Foundries and Machine Shops

BY W. J. LAUCK.

The Southern and Eastern European immigrant is not only a wage earner in the basic industries of the country, such as iron and steel manufacturing, and coal, iron ore and copper mining, but has also found extensive lodgment in the operating forces of practically all branches of mining and manufacturing activity. This condition of affairs is due to a number of causes, the most important of which has been the invention of improved machinery and mechanical devices which have eliminated the skill or period of apprenticeship formerly required for certain classes of occupations. There has also been a gradual advancement in the industrial scale by immigrants who have been in this country for an extended period of time. The extraordinary industrial development of the past 30 years and the consequent demand for labor have also brought about an upward pressure and a tendency to adapt industrial organization and methods to the characteristics of the recent immigrant labor supply. The Southern and Eastern European industrial workers have been marked by a lower degree of efficiency, and have been less acceptable to the employers than the wage earners of past immigration from Great Britain and Northern Europe, but the iron and steel manufacturer and the mine operator have largely found it necessary to use the existing labor supply in the best way that could be devised. The unanimous testimony of employers is that the Southern and Eastern European is not desired as an employee, but is taken for the reason that other labor at the present time cannot be secured. As a result, the recent immigrant is at work to-day in certain occupations and branches of manufacturing which a generation ago were occupied exclusively by Americans or immigrants from Great Britain and Northern Europe who, unlike the foreign born workmen of the present time, had received training and experience before coming to the United States. This situation is well illustrated by the presence of the recent immigrant wage earner in some of the branches of the steel and other metal manufacturing industries which are turning out the more finished and highly fabricated products.

In Foundries and Machine Shops

In the manufacture of foundry and machine shop products, the study of the Immigration Commission, which was based on original information from 16,000 employees of the industry showed only one-fourth of the total number of persons employed to be native Americans, while slightly more than one-half, or 55 per cent., are of foreign birth. The remaining one-fifth, or 20 per cent., of the employees are of the second generation or of native birth, but of foreign born Irish, German, English or Canadian fathers.

Of the immigrant workmen in foundries and machine shops only about one-fifth are representatives of English, Irish, Scotch, German, Swedish, French, English Canadian and other races of past immigration, the German element being predominant. The other foreign born wage earners are Southern and Eastern Europeans who have been in the United States only a short period of time. The Poles with a proportion of 12 per cent., the South Italians with 7 per cent. and the North Italians with 4 per cent. of the total number of employees constitute the largest racial elements. Other races of recent immigration represented in considerable numbers are the Slovaks, Russians, Magyars, Lithuanians, Greeks and Croatians.

In Locomotive Works

Another advanced branch of iron and steel manufacturing which has a large proportion of recent immigrants

among its employees is that of locomotive building; but slightly more than one-fourth of the total operating force of this industry is composed of native Americans. A similar proportion is made up of wage earners of the second generation of immigrants, the descendants of German and Irish being in the majority. Almost one-half of the employees, or 49 per cent., are of foreign birth. The foreign born wage earners are about evenly divided in numbers between the races of the old and the new immigration, the Irish, Germans and English together constituting about one-fourth, and the Poles, North and South Italians, Magyars, Russians and Slovaks combined form a similar proportion of the total number of persons employed in the industry.

Comparatively few recent immigrants are employed in the locomotive works at Richmond and other points in the South. One-half of the wage earners in the plants at Philadelphia, Pa.; Dunkirk, N. Y., and other cities in the Middle and Eastern States are of foreign birth, while only 11 per cent. of those in the South were immigrants. Poles and Russians are the chief races from Southern and Eastern Europe employed in the locomotive establishments in the South, but together they constitute only about 5 per cent. of the operating forces. About 5 per cent. also of all the employees in the South are Negroes. More than three-fourths are native Americans. On the other hand, in New York, Pennsylvania and other Northern States Poles, Magyars, Lithuanians and North and South Italians, of races of recent immigration, are found in large numbers, while the races of the old immigration from Great Britain and Northern Europe are represented in largest proportions by the English, Irish, Germans and Scotch. Native Americans form only 24 per cent. of the total number of wage earners in the locomotive building plants of the North and East.

In Car Building Works

Still another example of the extensive employment of recent immigrants is found in the racial composition of the operating forces of steel and wooden car building and car repairing establishments. More than 21,000 of the workers in this branch of manufacturing were studied by the Immigration Commission, of which number 675 are in the South, 10,300 in the Middle West and 10,900 in the Middle and New England States. In this important industry the immigrant wage earners constitute 54 per cent., the native Americans only 30 per cent. and the persons of the second generation of immigrants 16 per cent. of all the employees. The principal races of wage earners from the South and East of Europe are the Bohemians and Moravians, Croatians, Greeks, North and South Italians, Magyars, Poles, Russians and Slovaks. The Poles constitute one-eighth of the total number of employees.

In the car building and car repairing plants of the States east of the Ohio and north of the Potomac rivers, Slovaks, Ruthenians, Russians, Poles, Magyars, North and South Italians, Croatians, Germans, English and Irish are employed in considerable numbers. In the South 67 per cent., in the East 37 per cent. and in the Middle West only 13 per cent. are native Americans. In the South almost one-fifth of the operating forces are negroes and only 5 per cent. of the total number of employees, composed of a few Germans, Irish, Hebrews and Russians, are of foreign birth. In the States of Ohio, Indiana, Illinois and Michigan the Poles constitute 15 per cent. and the Swedes and Germans each 10 per cent. of the operating forces. The Servians, Russians, Magyars, Lithuanians, North Italians, Dutch and English and French Canadians are also extensively employed in car building plants of this section.

Southern and Eastern Europeans are also extensively employed in other advanced branches of iron and steel manufacturing, such as the production of cutlery and tools, firearms, electrical machinery and supplies, and even such highly specialized products as typewriters and sewing machines in which the working of steel plays an important part. In these industries North and South Italians, Magyars, Poles, Russians and Slovaks are found in large numbers. The employment of the recent immigrant, in short, has not been confined to the blast furnaces, steel mills and coal and iron ore mines, but is characteristic of all branches of mining and manufacturing, and even of the establishments making highly fabricated steel products.

It is also a striking fact that a large proportion of the immigrant employees of finished steel products establishments have been in this country only a short time. Of the foreign born wage earners in steel and wooden car building plants, as well as those engaged in the production of electrical supplies and machinery, about one-third have been in the United States less than five years. Of the immigrants employed in foundries and machine shops about two-fifths are of a residence under five years. One-half of those engaged in the manufacture of cutlery, tools and hardware and two-fifths of the immigrant employees of locomotive building plants have been in this country less than 10 years. Since most of the recent immigrants are from the agricultural classes of Southern and Eastern Europe, and without industrial training and experience, their extensive employment after a brief residence in the United States has been made possible by mechanical inventions which have brought about a high division of labor and rendered unnecessary, as already mentioned, any long period of apprenticeship.

The Quebec Bridge.—It is stated that the engineers to whom the Quebec Bridge tenders were referred have reported 4 to 1 in favor of the St. Lawrence Bridge Company's offer. The design prepared by Phelps Johnston, managing director of the Dominion Bridge Company, one of the two corporations composing the St. Lawrence Bridge Company, is said to have been preferred by the experts to the official design. The company submitted tenders on both designs. It is further stated that the St. Lawrence Bridge Company will spend $2,000,000 on new machinery if it gets the contract, as shops will have to be built.

The blast furnacemen and kilnmen employed at the Ashland, Wis., plant of the Lake Superior Iron & Chemical Company went out on a strike February 15 against a 10 per cent. reduction in wages, notice of which was posted a few weeks ago. The plant was at once closed down. On Saturday morning, February 18, two-thirds of the men who had struck voted to return to work on the terms offered by the management, which were the rate of wages originally posted, and the condition that the men who were considered responsible for the trouble would not be re-employed. On Saturday afternoon operations were resumed without difficulty, no concessions being made to the strikers.

The Annual Motor Boat Show opened on Tuesday in Madison Square Garden, New York City. It will continue until March 4. More than 300 exhibitors and their assistants are to be found there, explaining the different types of the internal combustion engine and its accessories in use. The exhibits range from the tiny launch to the luxurious craft for cruising purposes. Every section of the country is represented with the latest models and designs in motor boating. The exhibitors also include gasoline engine builders and manufacturers of a great variety of products used in equipping or furnishing motor boats.

The Edwards Mfg. Company, "the sheet metal folks," Cincinnati, Ohio, owing to its largely increasing business, has established a traffic department, and has secured the services of J. H. Blanton as traffic manager. He was formerly connected with the Louisville & Nashville Terminal and the Nashville, Chattanooga & St. Louis Railroad, at Nashville, Tenn., and is well qualified to look after the intricate details of his department.

In the Canadian House of Commons the Finance Minister stated in reply to a question that British goods of the kind mentioned in the reciprocity agreement would be admitted on the same basis as United States goods.

"Building Up" Impurities in Steel

A Formula for Accumulations of Copper, Phosphorus and Sulphur in Scrap

BY A. H. JAMESON.

In steel plants, and particularly in steel foundries where the side blow converter is used, one hears a good deal about the accumulation in the steel of certain of the injurious elements, through the return of the steel scrap to the furnaces. There seems to be much uncertainty as to the extent or limit of this "building up," as it is called, so that some fear to use any scrap, but that lowest in the content of these impurities, selling their own scrap or sending it to a basic furnace and buying what scrap they need for their own uses. Then, too, some refuse to use cupriferous pig iron at all, fearing that an excessive amount of copper will accumulate in the steel, while many insist upon a pig iron much lower in phosphorus than is necessary, for fear of this same "building up" in the steel.

The problem, however, is not a difficult one to solve and may be expressed algebraically. It should be remembered that, through the melting and converting losses, we do condense in the steel any element which does not itself suffer loss in the melting or conversion. But this condensation takes the form of an increase in the percentage by gradually decreasing increments, and theoretically the increase goes on for an infinite number of operations. But it approaches a limit, even though it never reaches this limit, and if we plot a curve to show the increase in percentage by ordinates and the number of operations by abscissae we find that at infinity the curve becomes a straight line.

Practically we are interested in the limit only. We wish to know what will be the maximum content in the steel after a long run, and this we can determine readily.

Let a = the percentage of steel scrap in the cupola charges.
$100 - a$ = the percentage of pig iron in the cupola charges.
b = percentage of loss in both melting and converting.
c = percentage of the element in question in the pig iron used.
x = the maximum percentage of the element in the steel after an infinite number of operations.

When the limit is reached, and "the curve becomes a straight line," we shall find, of course, that after any operation our steel contains exactly the same percentage of the element in question that was in the steel scrap which was charged to the cupola furnace as stock for that blow, so that

$$x = \frac{(100 - a)\,c + ax}{100 - b}$$

And by resolving:

$$x = \frac{(100 - a)\,c}{100 - (a + b)} \text{ or } \frac{100\,c - ac}{100 - (a + b)}$$

Let us suppose a case where we are using a pig iron with 0.8 per cent. of copper, where we use 30 per cent. of our own steel scrap in the cupola, and where our melting and conversion losses total 15 per cent.

Then $a = 30$
$100 - a = 70$
$b = 15$
$c = 0.8$ and $x = \frac{70 \times 0.8}{100 - 45} = 1.01818 +$

Now let us see how quickly this limit of 1.01818 + per cent. copper is approached. If we start our first charge, assuming that we have no steel scrap, so that we use pig iron only, we shall have, owing to the 15 per cent. loss in the melting and conversion $\frac{0.8}{0.85} = .9412$ per cent. copper in the resultant steel. The second blow will give us for the pig iron (70 per cent. of the charge) 0.70 x 0.8 = 0.56 and the steel scrap (30 per cent. in the charge) 0.30 x 0.9412 = 0.28236 and 0.56 + 0.28236 = 0.84236, and this divided by 0.85 = 0.99094 per cent. copper in the resultant steel.

Similarly the third blow will yield 1.00857 per cent. of copper in the steel, having used 30 per cent. of the steel scrap containing .99094 per cent. of copper. The fourth blow will yield a steel containing 1.01473 per cent. of copper; the fifth blow, steel containing 1.0168 per cent. of copper—in each case using 30 per cent. of steel scrap with the copper content yielded in the preceding blow. We find, therefore, that five blows are enough to bring the copper percentage to within .0014 per cent. of the theoretical maximum, quite within the limits of ordinary analytical accuracy.

It will be noted that the foregoing formula and calculation are applicable to an element which, like copper, gains nothing from outside sources. Now, let us see what is the problem in the case of sulphur or phosphorus, which are increased by the amount absorbed from the fuel in the melting. Let d = the percentage of the element which is taken up by the metal in one melting operation; this can be determined readily by analysis of the stock before and after melting, and is a constant for a given fuel and burden. Then our original formula will become

$$x = \frac{(100 - a)\,(c + d) + a\,(x + d)}{100 - b}$$

and by resolving

$$x = \frac{(100 - a)\,c + 100\,d}{100 - (a + b)} \text{ or } \frac{100\,(c + d) - ac}{100 - (a + b)}$$

So that this formula is identical with the original except for the addition of the 100 d, and it is apparent that all we need to do is to add in the first place the amount "picked up" in a single melt to the percentage in the pig iron itself and use this sum as the constant c in the original formula.

Let us assume a melting loss of 15 per cent., a steel scrap burden of 40 per cent. of the charge, a pig iron containing 0.05 per cent. of phosphorus and an addition of 0.01 per cent. of phosphorus by the fuel in one melting operation.

Then $a = 40$
$100 - a = 60$
$b = 15$
$c = 0.05 + 0.01 = 0.06$
$x = \frac{60 \times 0.06}{100 - (40 + 15)} = \frac{3.6}{45} = 0.08$

which is the maximum amount of phosphorus which can be accumulated in the steel under the conditions assumed. Now, let us perform the calculation for a few blows, as we did for the pig iron containing copper:

$$\frac{0.06}{0.85} = 0.07058824$$

the percentage of phosphorus in the steel from the first blow.

$$0.60 \times 0.06 = 0.036$$
$$0.40 \times 0.07058824 = 0.028235296 = 0.064235296$$

and this divided by 0.85 = 0.0755709, the percentage of phosphorus in the steel from the second blow.

Similarly we find 0.077798 per cent. of phosphorus in the steel for the third blow, 0.078963 for the fourth blow, and 0.079512 for the fifth blow, bringing the steel to within 0.00488 per cent. of the theoretical maximum of phosphorus, surely well within the limits of analytical accuracy.

By the use of this formula, then, it is possible to determine just how far these elements will increase in the steel under any given conditions, and consequently what analysis of pig iron one needs to specify in order to obtain steel of any desired content of copper, sulphur or phosphorus.

Since February 1 three more Edgar Thomson blast furnaces of the Carnegie Steel Company, at Bessemer, Pa., have been started, and at present 9 out of the 11 stacks at this plant are in blast. Furnace J, which has recently been rebuilt and remodeled, was started February 6, and has a capacity of about 550 tons per day. This stack had been idle for about seven months.

The Sheffield Foundry Company, Chicago, has purchased the property at the southeast corner of Hawthorne avenue and Herndon street, which it has been occupying under lease.

The Harrington 16-32-In. Extension Lathe

An Entirely New Design of High Speed Machine Tool

A new size and an entirely new design of extension lathe for high speed duty has been recently brought out by Edwin Harrington, Son & Co., Inc., Seventeenth and Callowhill streets, Philadelphia, Pa. All the general features of the maker's regular line have been retained, and provision has also been made for the addition of a taper attachment, quick change gear box and motor drive, either separately or in combination, at any time after the lathe has been purchased. Fig. 1 is a general view of the new tool, while Fig. 2 shows some of the details of the headstock and the carriage.

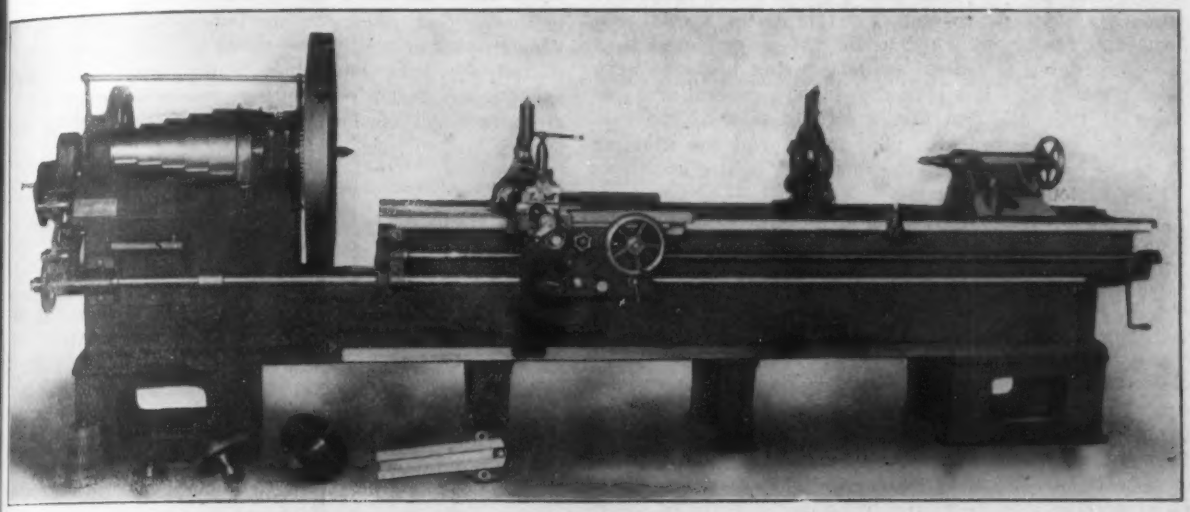


Fig. 1.—The New Extension Lathe Built by Edwin Harrington, Son & Co., Inc., Philadelphia, Pa.

Both the top and the bottom beds are very wide and are carefully fitted and securely braced in position. The movement of the upper bed is controlled by a screw operated by a crank at the end of the lathe. The necessary support for this bed is furnished by bolts in T-slots and two jack screws, which are placed under the overhanging end. As will be noticed from Fig. 2, the construction of the headstock is very strong. It is driven by a five-step cone pulley, and ample power is supplied by the triple gearing with which it is equipped, the ratio being 25 to 6. The hollow spindle is of forged high carbon steel and runs in very large bearings in phosphor bronze boxes. All regular screw threads from 2 to 28 per inch, including an 11½ pipe thread, can be cut when the lathe is equipped with an ordinary swing yoke, three changes of feed being obtained from a sliding clutch pin and a cone of gears. If a quick change gear box is used the various feeds and screw threads are obtained by a combination of the lever of the gear box and the clutch pin. Metric threads can also be cut on the lathe, special gears being provided for this purpose, with either the swing yoke or the gear box.

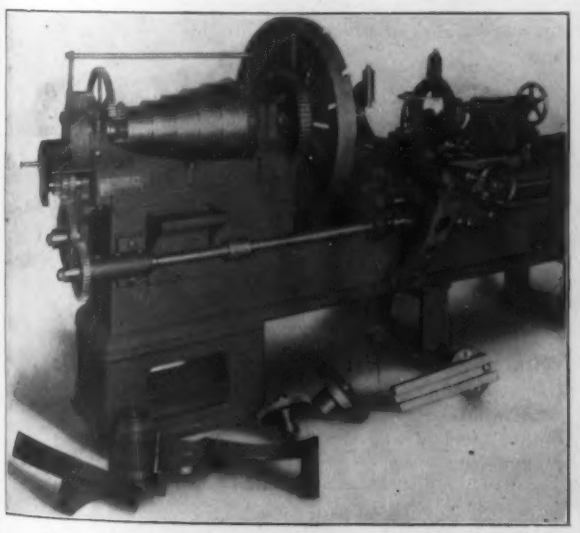


Fig. 2.—Details of the Headstock and the Carriage.

The bearing of the carriage on the bed is long and self-oiling. There is a rigid support for the cross slide, having an adjustable shoe on the lower edge of the bed, which is used when turning work of large diameters. For turning work across the gap an extension tool post is supplied to replace the regular compound rest. The lateral and cross feeds are operated by a geared friction located in the apron, and the reversal of the feed is accomplished at the same point. To prevent the turning and the screw cutting feeds from being engaged at the same time a positive interlocking device is furnished.

The following table gives the principal dimensions and specifications of the lathe:

Swing over bed, inches	16
Swing in gap, inches	32
Swing over carriage, inches	11
Ratio of back gearing	6 to 25
Ratio of triple gearing	25 to 6
Minimum number of threads cut, per inch	2
Maximum number of threads cut, per inch	28
Maximum feed, inches	0.146
Minimum feed, inches	0.0104
Number of cone pulley steps	5
Diameter of smallest cone pulley step, inches	6
Diameter of largest cone pulley step, inches	11½
Face width of cone pulley steps, inches	3¼
Diameter of hole in spindle, inches	1 9/16
Diameter of front spindle bearing, inches	3¼
Length of front spindle bearing, inches	5⅜
Diameter of rear spindle bearing, inches	2⅜
Length of rear spindle bearing, inches	4¼
Diameter of tailstock spindle, inches	2
Length of tailstock spindle, inches	12⅞
Length of bed, inches	98
Distance between closed centers, inches	48
Distance between extended centers, inches	87
Diameter of face plate, inches	32
Maximum diameter in steady rest, inches	6⅞
Maximum diameter in follow rest, inches	4
Face width of countershaft pulleys, inches	8½
Diameter of countershaft pulleys, inches	12
Speed of countershaft, revolutions per minute	168
Weight, pounds	4,000
Weight per foot of extra length of bed, pounds	325

When the lathe is equipped for motor drive, the motor is mounted directly on the headstock and meshes with gears which replace the five-step cone pulley, and a hand wheel at the apron controls the speed of the motor. The taper attachment is connected to the back of the carriage, and special lugs cast on the bed are not required. When the lathe is equipped for belt drive the countershaft has three pulleys, one tight and two loose ones. This gives a means for running the lathe spindle in either direction without employing a crossed belt.

The Kempsmith Mfg. Company's New Plant

A Number of Special Features Are Embodied in Its Design and Construction

The new plant of the Kempsmith Mfg. Company, Milwaukee, Wis., is one of the best equipped machine shops in the Northwest. It is especially interesting as in planning its design and arrangement problems peculiar to the manufacture of milling machines, which is the company's specialty, had to be solved. For this reason special systems and equipment which could not be employed in a company doing a general manufacturing business have been used. Fig. 1 is a plan showing the general arrangement of the buildings, Fig. 2 gives details of the construction of the brackets used to suspend the shafting from the roof trusses and the remaining figures are views of the various departments.

There are four buildings in all—the main factory, the power house, the pattern shop and the office. The first three buildings are of fireproof construction. The factory proper is of the modern type, in which a large amount of structural steel is employed. The floor and the roof which is of the customary saw-tooth type are of concrete. There are no interior partitions, and the entire space, which is 300 ft. long and 250 ft. wide, is a single room. The pattern shop and the power house are of the modern steel girder type, with concrete floor and roof, the former occupying a space measuring 50 x 90 ft., and the latter being the same width and 10 ft. longer. The office building, which is not shown in Fig. 1, is also well equipped.

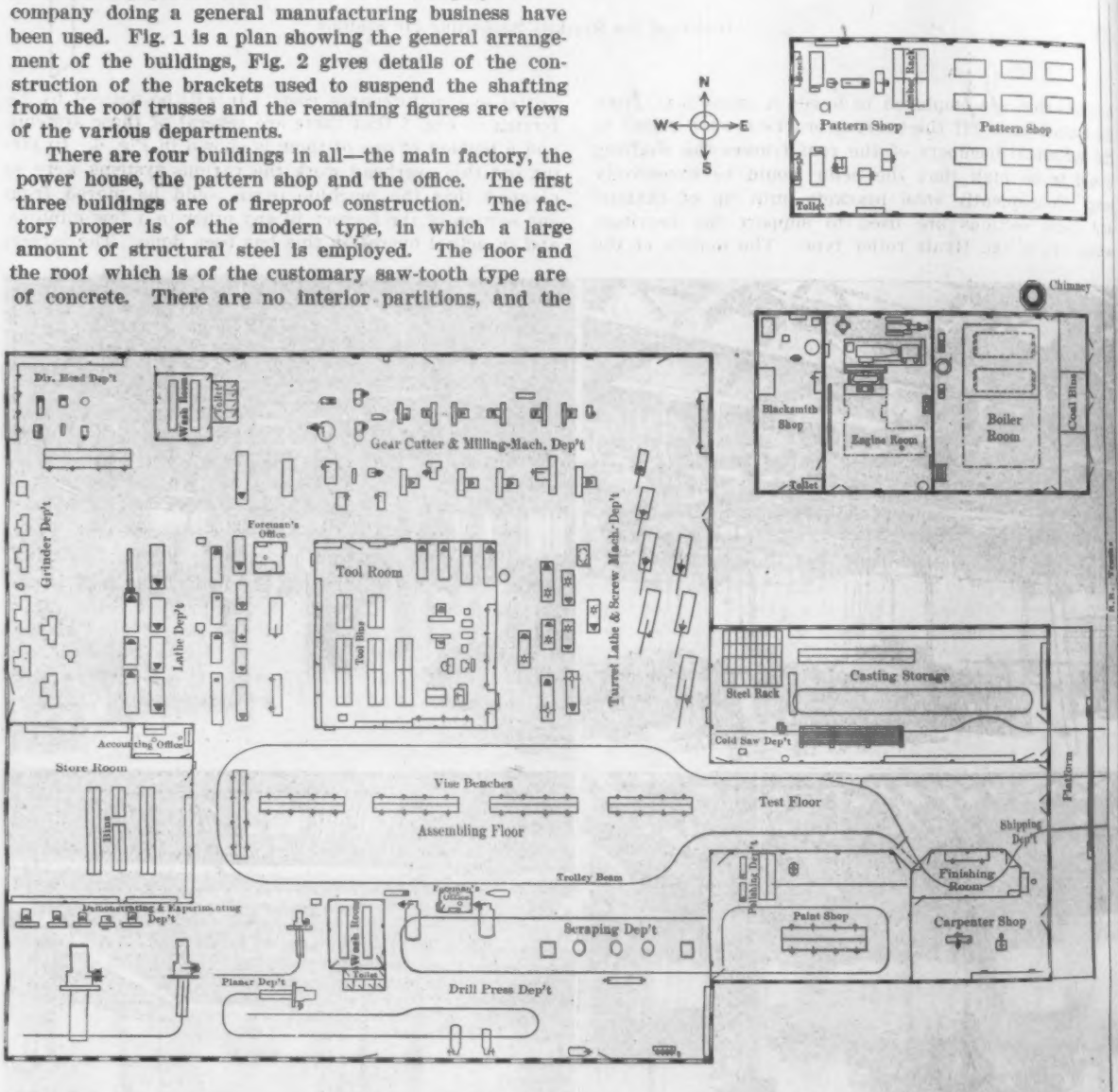


Fig. 1.—Plan Showing the Arrangement of the Buildings at the New Plant of the Kempsmith Mfg. Company, Milwaukee, Wis.

As far as possible in planning the general layout, the idea of convenience and a minimum amount of handling of the parts in the process of manufacture were the controlling factors. The factory is so arranged that these parts in passing from one machine to another make an automatic circuit of the shop from the machining department to the assembling, testing and shipping departments. A double system of supervision is employed, one superintendent looking after the manufacture of the small parts, while the other has charge of the making of the large castings, as well as the assembling, testing and shipping departments.

The group drive is used throughout the plant, all machines of one type being assembled in a group and driven by a single motor. Fig. 3, which is a view of the turret lathe department, shows a typical arrangement of the group drive. The motors are hung from the steel roof trusses on specially designed I-beam frames fastened with U bolts. The manner in which the motors are mounted is shown in both Figs. 3 and 4. Mounting the motors on frames in this way enables them to be shifted when necessary, and at the same time cutting of the steel work is eliminated. The group system of motor drive is more economical in a plant where specialized manufacturing of this kind is carried on than the individual motor drive, as these machines can in most cases be in operation for 75 per cent. of the time. In special cases where the service required of the machines is intermittent and irregular, individual motor drive is used.

On account of the extensive use of the group drive the line shafting is not long in any case. A somewhat novel feature in connection with the line shafting is the

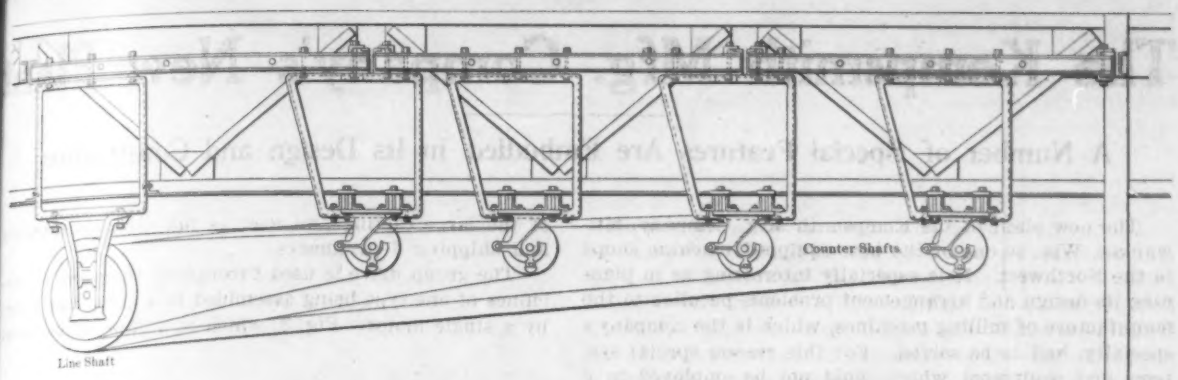


Fig. 2.—Details of the Brackets Supporting the Shafting.

brackets that are employed in lower it about 3 ft. from the main beams. If the bearing brackets were bolted to the horizontal members of the roof trusses the shafting would be so high that the belts would be excessively long. Consequently steel brackets built up of channel and angle sections are used to support the bearings, which are of the Hyatt roller type. The details of the construction of one of these sets of brackets are given in Fig. 2, and views of the brackets in position are shown in Figs. 3 and 5.

The castings entering into the construction of milling machines are not very large, and a single trolley system with an electric hoist will handle them equally as well as the large traveling crane, having both greater initial and maintenance costs. It will be noticed by referring to Fig. 1 that there are several of these systems, and a portion of one of them is shown in Fig. 6. In laying out this overhead work the various systems were so planned that the machine parts could be moved from one section of the factory to any other in a few minutes, and in actual operation this has been done. The largest machine produced in the factory, with all its equipment, fully boxed for export, can be lifted by the electric hoist and moved at the rate of 5 ft. per second, and the trolley with its load can be transferred from one beam to another by a switching device. The trolley system has been omitted from the milling machine department and the lathe and grinder departments, which are shown in

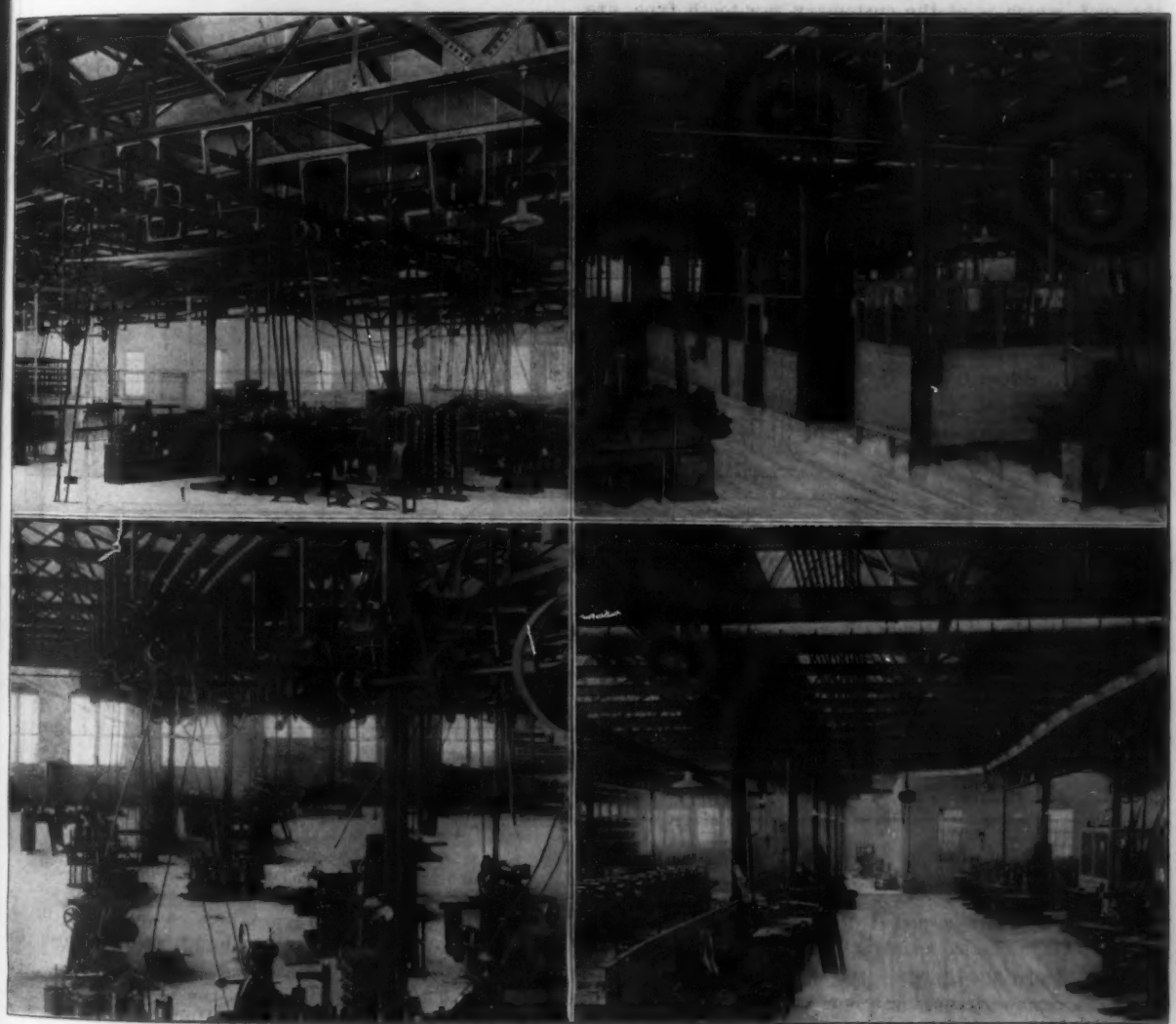


Fig. 3.—The Turret Lathe Department Showing Group Motor Drive.

Fig. 4.—The Foreman's Office with the Tool Room in the Rear.

Fig. 5.—The Milling Machine Department.

Fig. 6.—The Assembling Floor and Benches.

INTERIOR VIEWS OF THE VARIOUS DEPARTMENTS.

Figs. 5 and 7 respectively, as well as from that portion of the plant in which the automatic machines are installed, since in none of them are large castings machined, and the trolley system is not required to transfer parts being manufactured.

The most easterly section of the main factory, which is the one nearest the railroad track, is used for receiving and shipping. Two I-beam trolley tracks extend over the siding and thus give excellent facilities for unloading and loading cars. This portion of the factory is the natural location for the rough casting storeroom and the finishing and polishing room. The castings are unloaded from the cars and pass through one door, while the completed machines come through the other from the finishing and the polishing rooms for shipment. This latter

Fig. 7.—The Lathe and Grinder Departments.

department is completely inclosed to keep out the dust from the rest of the factory.

The tool room, which is shown in Fig. 4, at the rear of the foreman's office, is located centrally between the assembling and the manufacturing departments. Delivery windows are situated on each side, and enough equipment is carried to avoid any delay due to having a machinist wait for tools. The stock room is also conveniently located. It is equipped with steel bins for storing those machine parts which are completely finished, but are awaiting assembling. As in some cases several months may elapse between the time parts are finished and the machines for which they are designed are assembled, a large amount of space is required. The offices of the stock-keeper, the time-keeper and the cost accountant are in this room, and complete records of the cost of each part and operation, no matter how small, are kept in this plant.

The assembling department, Fig. 6, is located between the large and the small manufacturing departments. The row of benches extending along the center permits machines to be assembled on both sides. The trolley system makes a complete circuit of these benches, and is in constant service for shifting machines being assembled. This loop of the trolley system is clearly shown in the engraving, as well as the rows of partially assembled machines at either side.

The foreman's office, Fig. 4, is completely inclosed by glass. In this way the noise of the machines and unimportant matters do not disturb him. As the room is elevated about a foot above the main shop floor he is enabled to get a complete view of his department at a glance without leaving his desk.

In one corner of the building a demonstrating and experimental department has been fitted up. A row of the company's individual motor driven machines will be set up here for demonstration for buyers, and to enable experiments to be conducted by the maker's engineers. A complete set of electrical instruments and automatic recording devices are included in the equipment of this department.

The power generating equipment for the entire plant is all housed in a separate structure, measuring 50 x 100 ft. over all. The building is of fireproof construction, and a concrete roof is supported by five girders. The building is divided into three rooms, a blacksmith shop measuring 17 ft. 8 in. x 47 ft. 10 in.; the engine room, which is 31 ft. x 47 ft. 10 in., and the boiler room, which is 47 ft. x 47 ft. 10 in. Heavy brick walls are used to separate the three rooms, which connect with each other and also have separate entrance doors. Ample light and ventilation are provided by numerous windows on both sides and one end.

At the present time the boiler equipment consists of two 100-hp. horizontal return tubular boilers built by the Milwaukee Boiler Company, but space is provided for the future installation of two additional boilers of the same size and type. The customary water columns, feed and blow-off connections, gauges and safety valves are included in the equipment, as well as a steam flue cleaner. The smoke breeching is connected with a 100-ft. Costodus radial brick chimney, having an internal diameter of 4 ft. 6 in. at the top. Hand operated dampers placed in each boiler flue control the draft, and the boilers are hand fired with mine run bituminous coal. The coal bins are located along one end of the boiler room. The boiler feed water supply is taken from the city mains and passes through a 200-hp. Cookson open feed water heater, and is delivered from there to the boiler by a feed pump. The feed water heater, boiler feed pump and the vacuum pump are located in the space between the back of the boilers and the partition separating the boiler and the engine rooms.

The boilers deliver steam to the engine at 125-lb. pressure through a 6-in. extra heavy wrought iron pipe line covered with 85-per cent. magnesia covering, furnished by the H. W. Johns-Manville Company. The engine room equipment consists of one 14 x 30 in., 200-hp. Vilter rolling mill type Corliss engine, direct connected to a 150-kw., 250-volt compound wound direct current Crocker-Wheeler generator operating at a speed of 120 rev. per min. An automatic oiling system is employed. The engine is run noncondensing and the exhaust steam is used for heating. The Webster heating system is installed and the exhaust line from the engine is provided with an automatic back pressure valve. If required live steam can also be used as an automatic reducing valve is installed. In all 13,100 ft. of pipe coils and cast iron radiators are used.

The switchboard, which is installed back of the engine near the brick partition between the engine room and the blacksmith shop, consists of six panels of 2-in. dull black finished slate mounted on a pipe framework. The board consists of one generator panel, a panel for an additional generator for which space is provided in the engine room, one balancer panel and three feeder panels, one for power and two for lighting. A swinging

voltmeter bracket also forms a part of the equipment of the board. I. T. E. independently operating arm circuit breakers are mounted on the feeder panels and no switches are used. Double pole breakers are installed on the power feeder panels and triple pole breakers on the lighting feeder panels. Each feeder circuit has its own individual watt-hour meter, which enables a detailed record of the energy used in each of the various portions of the factory to be secured. A triple pole circuit breaker connected between the generator and the lighting feeder bus bars protects the balancer. Only one release coil is provided and this is on the neutral wire. If the load should become excessively unbalanced and overload the balancer, all three wires are opened simultaneously. This arrangement eliminates any chance of the lamps on the lighting system being burnt out, due to an unbalanced condition.

All the wiring from the generator to the switchboard and from the switchboard to the machine shop, pattern shop and office is run in a bituminized fiber conduit laid underground in concrete. These cables are lead sheathed and the insulating compound used contains 30 per cent. Para rubber. The wiring for the various buildings is done in rigid iron conduit and the insulating compound contains 22 per cent. of Para rubber. The distribution cabinets are located as near as is practicable to the center of distribution and are constructed of sheet steel, with slate panels and copper switches and bus bars. All the conduits terminate in fittings having porcelain covers, which results in a minimum amount of wire being exposed.

With the exception of the motors driving the planers, which are heavily compounded, Allis-Chalmers and Crocker-Wheeler shunt wound motors are employed throughout the plant. The Allen-Bradley Company's motor starters are used exclusively. Each motor has a separate slate panel containing the motor starter and an I. T. E. double arm circuit breaker. Liberal distances between the shaft centers are provided, thus insuring a good belt contact, and the consequent keeping of the motor bearings cool during operation.

Every consideration was given to the principles of modern illuminating engineering in planning the illumination of the shop and the power house. The prime objects desired in the lighting system were uniformity and economy, and these were accomplished by installing units consisting of a shock absorber, a conduit stem, a Benjamin steel porcelain enameled reflector and a 150-watt frosted bowl tungsten Mazda lamp. These units were hung 25 ft. apart and 10 ft. above the floor, as shown in Fig. 6, the plane of illumination being 4 ft. above the floor. The intensity of illumination varies from a maximum of 4.8 foot-candles to a minimum of 2.1 foot-candles. This has been found very satisfactory and individual units are needed only in a few locations. A very interesting feature of this installation is that, although the intensity of illumination is high, only 0.21 watts per square foot of floor area is required.

The office, which is in a separate building, not shown in Fig. 1, is housed in a modern two-story structure. On the first floor are the general office and the private offices of different officials, while the drafting room and the offices of the engineering department are located on the second floor. The basement is equipped for the convenience of the employees and has a dining room and kitchen, as well as a laboratory and a school room, where a weekly class for apprentices under the supervision of an instructor from the University of Wisconsin is held. The time spent by the apprentices in the class is considered as a part of their working hours, and they receive pay for it. All the departments of the various buildings of the plant are connected by an extensive telephone system.

The Greeley Square Realty Company, New York City, recently awarded the general contract to the Thompson-Starrett Company for an immense hotel to be erected on Thirty-third and Thirty-fourth streets and Broadway, near the new Pennsylvania Railroad Station. Over 10,000 tons of structural steel will be required, the contract for which has not yet been given out.

New York's Municipal Building

The 40-story municipal building now under construction in New York City will be one of the largest office buildings in the city; and the largest devoted entirely to housing municipal departments. At present these offices are scattered in various buildings, at considerable inconvenience and an annual expenditure of about $500,000 for rents.

The new structure is at the Manhattan terminal of the Brooklyn Bridge, and consists of a tower and two 25-story pavilions above the street level and below a triangular shaped space in which the Chambers street station for the bridge loop subway is located. Owing to the subway tracks the columns had to be spaced to clear them. The interior main columns extend as far as the fifth floor and support heavy girders on which the columns for the upper portion of the building rest, and are spaced irrespective of the lower arrangement to suit the layout for office floors.

The total amount of steel required was 26,000 tons. The largest girder weighs 50 tons, is 10 ft. ½ in. deep back to back of angles, and is built up of three ⅝-in. web plates, four 8 x 6 x ⅞ in. angles and six 14 x 13-16 in. cover plates (three on the top and three on the bottom). The largest column is 34 ft. long, weighs 34 tons, or a ton per foot, and carries a load of 3000 tons. The floor arches above the street level will be of hollow tile and below of reinforced concrete.

The lower columns rest on caissons, 106 in all, 68 of which were sunk to rock, a distance of about 135 ft. below the street, and 38 to a depth of 72 ft. to a good sand foundation.

The boilers for heating and supplying steam for the pumps are in the basement, while the fourth floor is laid out for the uses of plant and service. McKim, Mead & White are the architects for the New York City Bridge Department, the builders; the Thompson-Starrett Company, the contractors for the superstructure and the Pennsylvania Steel Company, the subcontractors for the structural steel fabrication.

New Railroad Equipment Orders.—The Bessemer & Lake Erie Railroad, controlled by the Carnegie Steel Company, has placed an order for 35 heavy road engines, divided between the American Locomotive Company and the Baldwin Locomotive Works. Last year this road leased 32 engines from other roads from May to October, and the order just placed will obviate that necessity this year. The Pennsylvania Railroad has ordered nine electric locomotives of the Westinghouse type. The Lehigh & New England has bought 500 steel hopper cars from the Cambria Steel Company and 300 box cars with steel underframes from the American Car & Foundry Company. The 1000 hopper cars ordered by the Virginian Railway from the Pressed Steel Car Company are part of a specification put out in the spring of 1910. Among inquiries actually made or under consideration are 500 coal cars for the Western Maryland, 110 freight cars for the Ann Arbor, 60 passenger cars for the New York, Westchester & Boston, 50 flat cars for the Vandalia and 12 milk cars for the Lackawanna.

It is stated that the increase of stock to be voted on by the Inland Steel Company's stockholders March 2 will be $1,500,000, bringing the total to $7,500,000, and that the proceds will be applied to the new blast furnace which the company plans to build this year.

Hill, Clarke & Co., Inc., Boston, Mass., have taken the exclusive agency in Maine, New Hampshire and eastern Massachusetts for the line of equipment manufactured by the Geometric Tool Company, New Haven, Conn.

Anti-injunction legislation is dead for this session of Congress, according to advices from Washington. There is no possibility at this time of an agreement by either House on the pending bill providing for a limitation of the power of the federal courts to issue injunctions.

The Story of a Floor Failure

Serious Corrosion of a Steel Beam Protected by Terra Cotta and Concrete

In the course of repairs and additions which were made in a large building containing power plant in an Eastern city lately, some interesting facts were brought out in connection with the use of steel beams inclosed in terra cotta fireproofing material and concrete.

The boiler room was in the basement, and the floor above it was supported on I-beams and channels, between

Fig. 1.—Scales of Rust 1-In. Thick on Upper Flange of Steel Beam.

which were sprung terra cotta tile arches. The lower parts of the beams were protected by terra cotta blocks, and the top was covered with a concrete floor 4 in. thick, which was surmounted with a tile office floor. The boiler room was not properly ventilated, and the domes of the boilers came within a few inches of the bottom of the I-beams. The ashes were raked from the ash pits and wet down in front of the boilers, and the steam rose against the ceiling and passed up through openings which had been cut in the floor to allow steam pipes to pass. It is undoubtedly true that the steam from wetting the ashes carried acid fumes resulting from the sulphur in the ash. The upper surface of the floor was always much cooler than the lower surface, and as there had been no attempt to make water or moisture proof the under surface of the fireproofing tile, the steam could penetrate it with ease.

As a consequence the vapors as they passed up through the tile were condensed against the concrete, and this kept the upper chords of the steel work constantly moist. The floor had been in place about five years. Its condition at one point was as indicated in Fig. 1. The upper portion of the beam had rusted so badly that the scales of rust on top of it were nearly 1 in. thick at the right of the illustration. This rusting had heaved the floor slightly. The paint on the lower portion of the beam is still in place, as in the illustration, and this was true in the case of nearly all of the beams.

An extreme case, Fig. 2, was an 8-in. channel which spanned the space between the I-beam shown in Fig. 1 and the next I-beam in the floor. An opening for a steam pipe had been cut through the floor close to the channel and an iron washer placed about the steam pipe on a level with the upper surface of the floor. The washer, however, was not tight enough to prevent some circulation to the room above. As a consequence, there had been a constant flow of moisture laden air through this opening, and it had condensed at the level of the relatively cool concrete floor.

As shown, the channel was eaten entirely away and the ¾-in. tie rod which bolted into it was also eaten off to a sharp point. In the illustration the point of the tie rod is shown slightly above the place where it formerly passed through the channel. The nut on the end of the rod was so badly corroded that it crumbled to powder in the hand. The small piece of metal behind the rule at the top of the illustration is a portion of the upper flange of the channel. At the point where the fillet thickens the section, the metal was not eaten away so fast, and this sliver of metal really represents the thick metal back of the fillets. The paint still remains on the channel at the right of the portion shown in the illustration, showing that the corrosion was local; in fact, 3 ft. from the point where the beam was eaten entirely through there had been practically no corrosion.

One interesting thing in connection with these specimens was the fact that the concrete of the floor slab adhered tenaciously to the scale which formed on the upper flanges of the I-beams. Two of these specimens are shown in Fig. 3. This concrete, however, seems to have been no protection to the metal so far as corrosion is concerned, and inspection shows it to have been of a very open nature, full of voids. The scale which formed on the sides of the I-beams and channels varied in thickness from ¼ in. to nearly 1 in., and showed distinct centers of action where the rust had built out into crater-like excrescences, seeming to indicate that the corrosion was due to electrolytic action to some extent, which probably resulted from the acid nature of the moisture.

The piece of scale shown at the left in Fig. 4 was taken from the face or web of one of the I-beams, while the piece shown in section at the right was taken from the top of the flange of one of the I-beams. Three large pieces of scale are shown in Fig. 5. The one at the left was taken from the face of the web of a 15-in. I-beam,

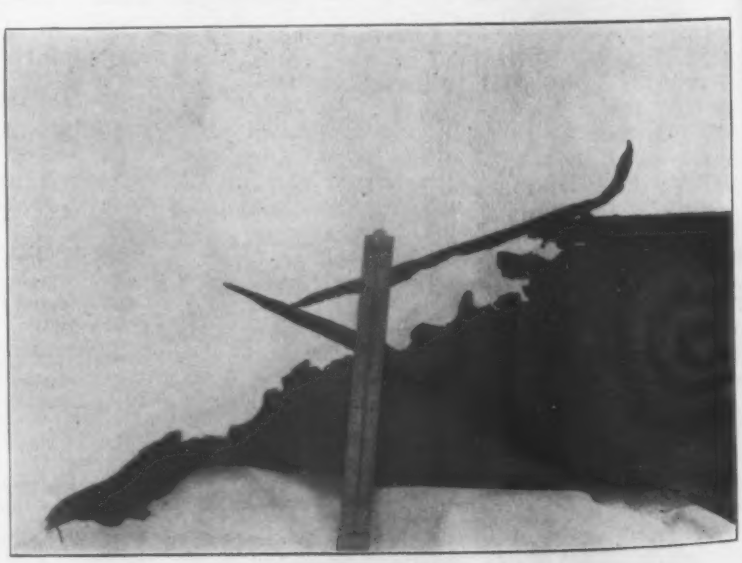


Fig. 2.—Corrosion of 8-In. Channel and Tie Rod.

while the one at the center and that at the right came from the top of the upper flange of the 15-in. I-beam. In Fig. 6 are shown in greater detail the point of the ¾-in. rod illustrated in Fig. 2, and a sliver of metal which was cut from the edge of the upper flange of one of the I-beams, which show considerable corrosion. The front edge of this piece is eaten away very irregularly and to a sharp edge. At the back the metal seemed to be in perfect condition. In fact, in all cases where the scale was removed the metal beneath it was found to be in excellent condition and of good quality.

The excessive corrosion shown took place almost wholly in one floor panel. As soon as it was discovered important points throughout the building were uncovered and investigated. In all cases above the first floor, where there was no moisture present in the shape of heated vapor, no corrosion was discovered, and even in the basement very little corrosion was found in any place except where the tile had been broken to permit the passage of steam pipes. In one case where a dumbwaiter passed through the floor the steel work had been laid bare and had corroded to some extent, and the steel pinion at the top of the dumbwaiter shaft had failed after very short use. Upon investigation it was found that the teeth were cut away to very thin, sharp points, and all of the metal

Fig. 3.—Adhesion of Concrete to Scale.
Fig. 4.—Pieces of Scale from I-Beam.

parts about it deeply corroded. This dumbwaiter was used only on rare occasions, and it is evident that when it was used the friction on the faces of the pinion teeth removed the rust and exposed a fresh surface for the moisture to attack. In this way the pinion was very quickly destroyed.

One of the columns near the place where the channel shown in Fig. 2 was located was of the box type, being composed of two channels with plates riveted on the sides. A hole was drilled through one of the plates near the base of the channel to see if it had corroded on the inside, and it was found that the channel was filled with water clear to the top. The moisture had evidently passed up through an opening intended for the pipes, condensed against the concrete floor and flowed into the column. As soon as the column became filled with moisture corrosion ceased and its interior was in excellent condition.

The principal lesson of the conditions described is that ample provision should be made in all boiler rooms for removing moisture laden air as quickly as possible, and the metal work should be so arranged as to prevent any possibility of vapor passing up beside it and condensing against the steel. Exposed steel work which was kept at such a temperature that the moisture could not condense on it, even though it was located in the same boiler room, showed no corrosion, and the paint upon it was in nearly perfect condition after nearly six years exposure.

If the temperature of the boiler room could be kept down to approximately the temperature of the other rooms in the building by ample fan circulation, the dangers of corrosion would be greatly lessened. In this particular boiler room the temperature frequently reached 120 or 130 degrees F., which made it exceedingly difficult for the men to work, and there was no provision for ventilation in the boiler room itself. In remodeling the plant arrangements were made for a forced air circulation and a large exhaust fan to take out the heated air and vapor.

Double Track Railroad Mileage Is Small

The mileage of double track railroads in this country is a much smaller percentage of the whole than generally

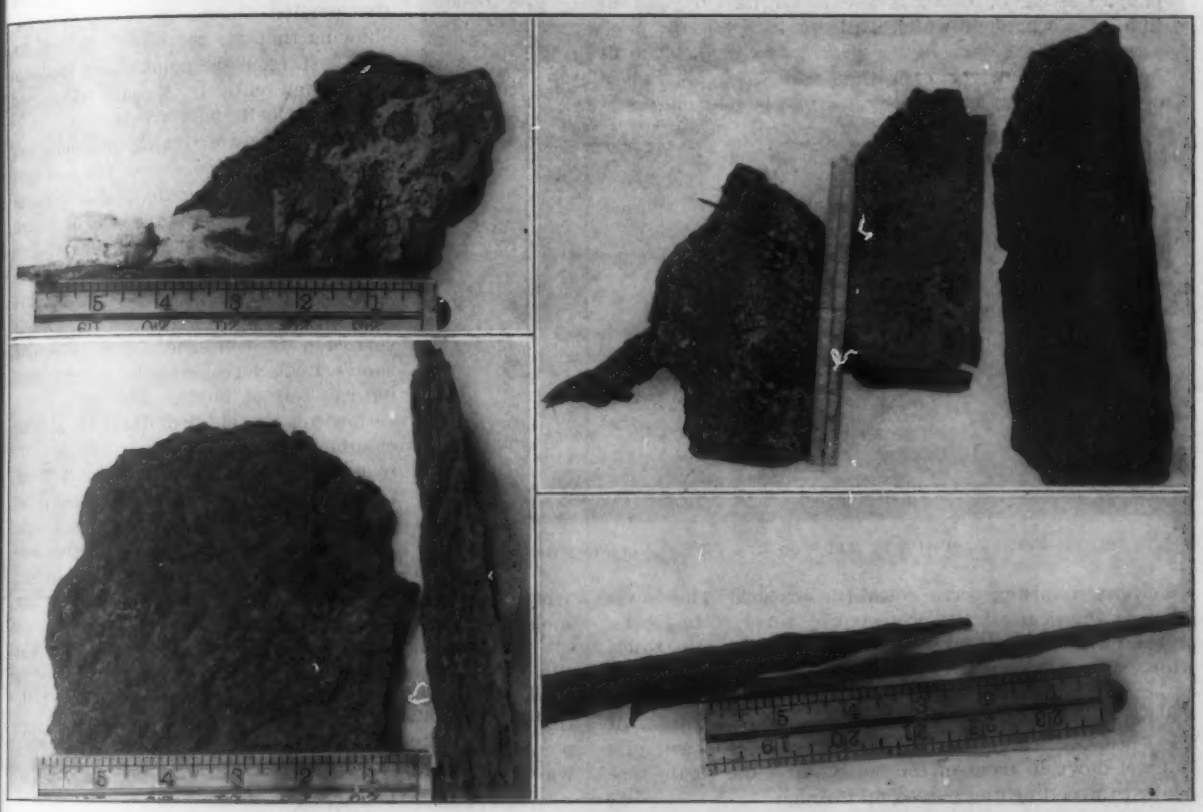


Fig. 5.—Three of the Largest Pieces of Scale.
Fig. 6.—Pointed Form of ¾-In. Tie Rod Due to Corrosion.

supposed. The official statistics of track mileage down to the last year available are as follows:

Year.	Single track.	Second track.	Third track.	Fourth track.	Yard track and sidings.	Total miles all tracks.
1908	230,494	20,209	2,081	1,409	79,452	333,646
1907	227,455	19,421	1,960	1,390	77,749	327,935
1906	222,340	17,396	1,766	1,279	73,760	317,083
1905	216,973	17,056	1,609	1,215	69,941	306,796
1904	212,243	15,824	1,467	1,046	66,492	297,073
1903	205,303	15,681	1,303	963	61,560	283,821
1902	200,154	13,720	1,204	895	58,220	274,195
1901	195,561	12,845	1,153	876	54,914	265,352
1900	192,556	12,151	1,094	829	52,153	258,784
1899	187,543	11,546	1,047	790	49,223	250,142
1898	184,648	11,293	1,009	793	47,589	245,333
1897	183,284	11,018	995	780	45,934	242,013

Even in England single track lines constitute nearly half of the total railroad trackage. In 1908 there were 23,209 miles of single track out of a total of 53,669 miles of track. The total trackage in England is far less than the miles of siding in the United States.

The Reading Iron Company, Reading, Pa., at its annual meeting last week, re-elected George F. Baer, F. C. Smink, S. R. Seyfert and Heber L. Smith directors, and chose Edward T. Stotesbury to fill the vacancy caused by the decease of Joseph S. Harris. Officers were elected as follows: Chairman, George F. Baer; president, F. C. Smink; vice-president and general manager, George Schuhmann; treasurer, Frederick Butler; secretary, George W. Delaney.

The Browning Pile Driver

A New Self-Propelled Machine Designed Especially for Railroad Use

Pile drivers at the present time are essentially self-contained outfits combining the mechanism necessary for their propulsion from place to place with the pile driving structure. The latter should be capable of driving piles at various angles while at the same time it can be easily and quickly lowered to within the standard railroad clearances for transportation. The new type of railroad pile driver built by the Browning Engineering Company, Cleveland, Ohio, is the latest development in a line of mechanism which had its inception in ancient Egypt, where a man and a maul were used. The drop hammer pile driver operating with a hoist line and driven by steam or gas engines or electric motors was

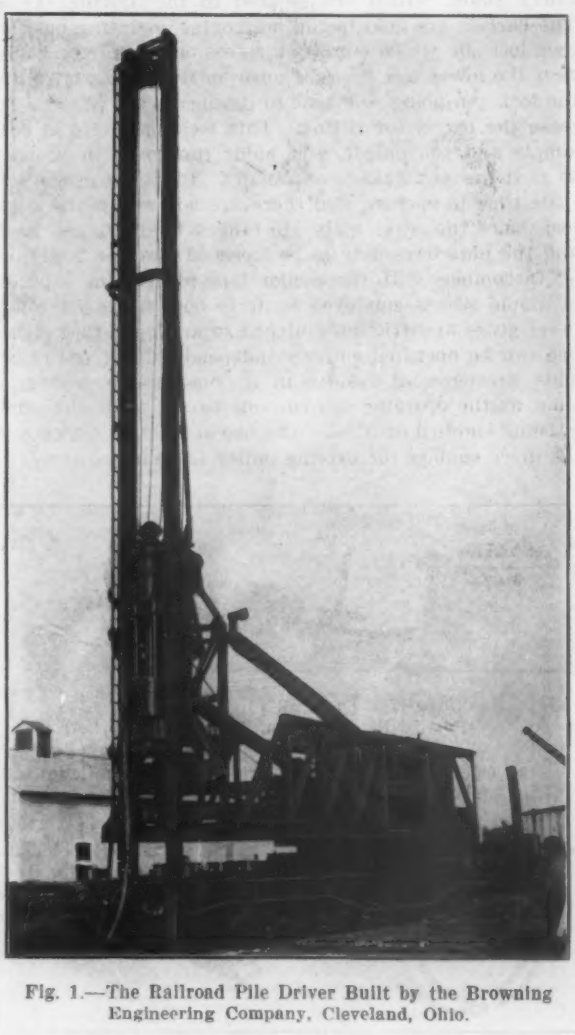


Fig. 1.—The Railroad Pile Driver Built by the Browning Engineering Company, Cleveland, Ohio.

developed from this primitive form. The invention of the steam hammer driver in which the driving element rests directly upon the top of the pile to be driven followed, and with these improvements the rapidity of the operations for forcing the pile into the ground has been increased. In railroad work especially to keep pace with this progress it is necessary that the pile should not only be picked up and placed into position quickly by the driver, but that the whole should be capable of rapid movement from place to place. Other requirements to be met include the driving of straight or batter piles either in front of the machine or on the sides of the right of way, and such a design as would permit the outstanding apparatus to be housed easily for transportation when the work was completed. Fig. 1 is a general view of the Browning railroad pile driver, while Figs. 2 and 3 show the machine driving batter and side piles respectively. In Fig. 4 the hammer and the leads are shown being lowered to a horizontal position.

The pile driver is of the steam driven revolving type

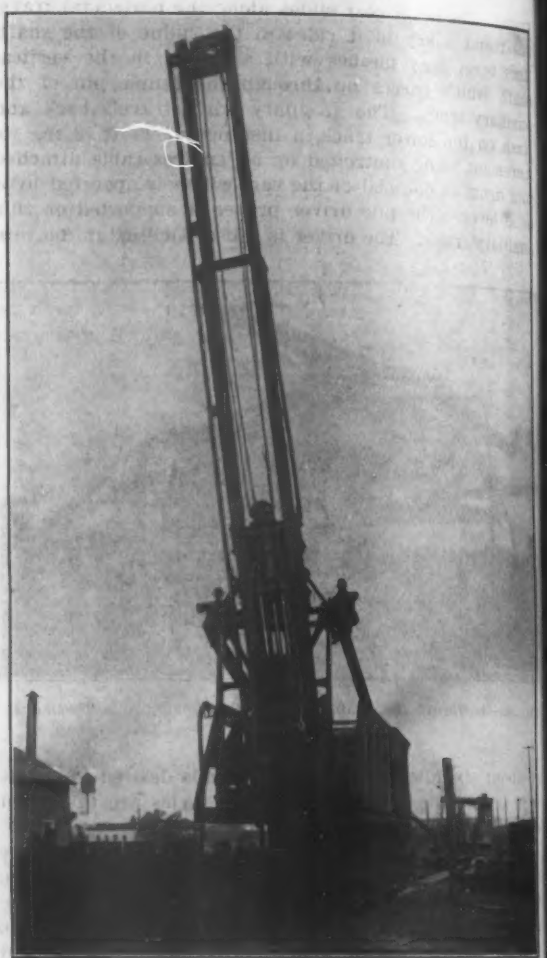


Fig. 2.—View Showing the Leads Swung to Drive Piles on a Batter.

and is capable of making 3 rev. per min. The truck is of the standard eight-wheel M. C. B. type. It is 45 ft. long and the distance from the center pin to the leads is 30 ft. One axle on each truck is driven by a spur gear

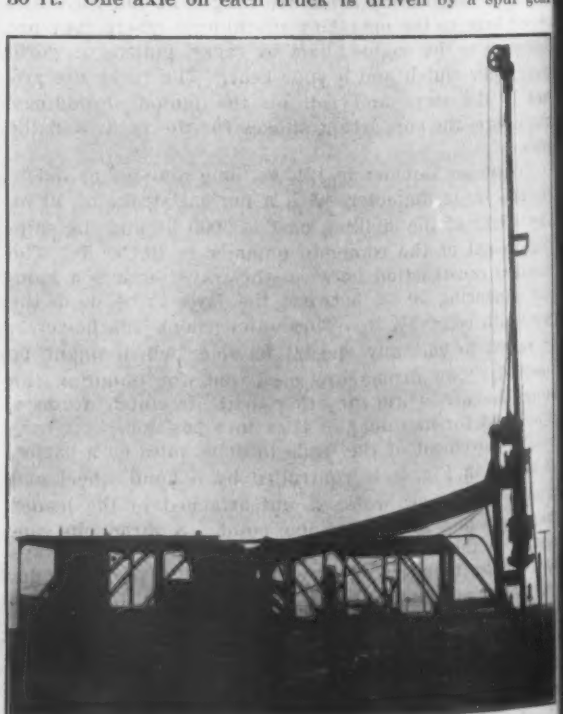


Fig. 3.—Driving Piles at the Side of the Track.

and pinion. Bevel gears are located on the pinion shafts and mesh with bevel pinions on a horizontal traveling shaft which extends through from truck to truck. This shaft is splined so that it is possible for the machine to propel itself while the upper base is at any point of its

travel. The bevel gear slides along the horizontal travel shaft and a key in it rides in the spline of the shaft. This bevel gear meshes with a pinion in the vertical shaft, which passes up through the center pin of the auxiliary truck. The auxiliary truck travels back and forth on the lower truck, a distance of 17 ft. 3 in., its movement being controlled by an endless cable attached to a drum at one end of the car, which is operated by a hand lever. The pile driver proper is supported on this auxiliary truck. The driver is self-propelling at the rate

Fig. 4.—Lowering the Hammer and the Leads to a Horizontal Position.

of about six miles per hour, but if it is desired to couple it in a train the pinions driving the axles are taken out of mesh.

The boiler, which is located at the rear end of the structural frame, is 60 in. in diameter and 8 ft. high. It is sufficiently large to furnish steam for both the propelling machinery and the hammer, the supply for the latter being carried through a heavy 4-in. wire wound hose. Channels are used for the pile driving ways, which are 65 ft. long and are carried by the swing frame. This frame is supported at the lower end by rigidly braced short radius arms, and at the upper by longer ones, an arrangement which enables the ways to be lowered into a horizontal position over the car for transportation. The long upper supporting arms are hinged at the ways and extend back to the operating machinery, where they are connected to the engine shaft by racks, pinions, a worm gear, a jaw clutch and a spur gear. The racks are riveted to the ways and roll on the pinion shroudings, which form the supporting flanges for the racks and the arms.

The steam hammer is 12½ ft. long and the cylinders are 13¾ in. in diameter, with a normal stroke of 42 in. The weight of the striking part is 5000 lb. and the shipping weight of the complete hammer is 10,150 lb. The standard construction between the ways permits a hammer measuring 20 in. between the jaws to be used, the jaw width being 8¼ in. These dimensions can, however, be varied to suit any special hammer which might be specified. Two drums are used, one for handling the steam hammer, while the other, with its clutch, forms a whip hoist for hauling the piles into position.

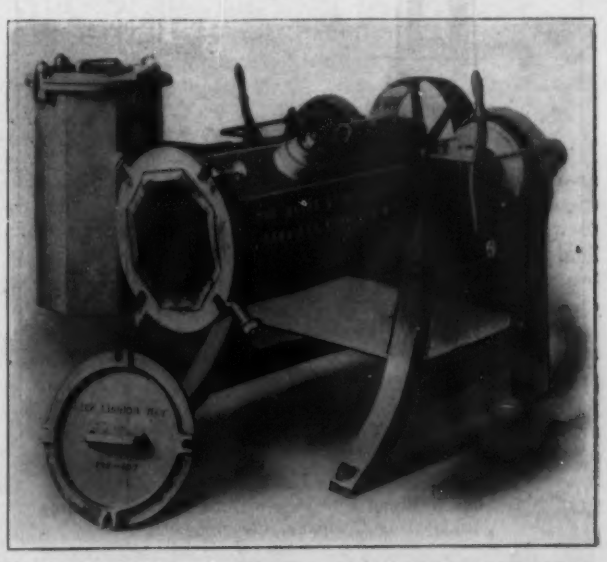
The movement of the leads to drive piles on a batter, as shown in Fig. 2, is controlled by a hand wheel and screw. The screw works a nut attached to the leader framing below the suspension point. A large pin connection at the top of the swing frame supports the ways and enables them to be set at an angle. The maximum side batter at which piles can be driven is 3 in. per foot and the front reach is 19 ft. from the leading truck wheels. All of the piles are hauled into position by an independently driven whip hoist. When driving piles on either side of the track the maximum distance from the center line is 28 ft. The lowering operation shown in Fig. 4 requires about 1½ min., and the hammer and the leads can be raised to the driving position in the same space of time. The machine will handle piles 90 ft. long having a butt diameter of 22 in. The hight of the pile driver when locked in position for transportation is 16 ft. The total weight is 150,400 lb.

The Baird Improved Tumbling Barrel

A new type of tumbling barrel for burnishing and buffing small articles with steel balls has been built by the Baird Machine Company, Oakville, Conn. This machine is an improvement on the double horizontal tilting tumbling barrel for the same class of work which was illustrated in *The Iron Age*, July 1, 1909. The success of the older machine has resulted in the development of many new ideas which have been perfected and incorporated in the later machine.

The octagonal barrels are of cast iron lined with maple wood. While the wooden lining is very durable this construction permits all the wearing parts to be renewed easily, thus prolonging the life of the machine. The barrels are kept in a horizontal position while in use, but for emptying or filling they can be easily tilted, as they are supported on trunnions near their centers by heavy yokes, which are secured to the driving shafts. The barrels are held in the horizontal operating position by a lock pin which engages a recess on side of the barrel near the lower end, a slight push on the lever controlling the lock pin being sufficient to disengage the pin and release the barrel for tilting. This locking device is both simple and convenient, and holds the cover in position so as to prevent leakage effectually. It also requires very little time to operate, and there are no loose parts to get lost, since the cover bolts are hinged to the barrel itself and the nuts have only to be loosened and not taken off.

In common with the earlier type of machine a pulley of ample size is employed to drive both barrels through bevel gears and friction clutches so arranged that either one can be operated entirely independently of the other. This arrangement results in a considerable saving of time, as the operator can run one barrel while the other is being emptied or filled. The use of friction clutches in the drive enables the driving pulley to be belted direct to



The Double Horizontal Tilting Tumbling Barrel for Burnishing with Steel Balls Made by the Baird Machine Company, Oakville, Conn.

the line shaft, thus eliminating a countershaft. Large bronze bushed bearings are used, and those of the main shaft have ring oilers.

The inside dimensions of the barrel are 10½ in. in diameter and 24 in. long. The use of this comparatively small diameter has been found by the builder to lessen the danger of bending, denting or otherwise injuring small or delicate parts which are being burnished, while at the same time the speed at which the work is turned out and the quality of the finish are not affected.

On March 1 all departments of the general offices of the Lozier Motor Company, heretofore located at 1751 Broadway, New York City, will be removed to Detroit, Mich.

The Reilly Friction Clutch

A New Power Transmission Device Suitable for All Classes of Machine Tools and Countershafts

A. S. Baldwin & Co., Sharon, Pa., are manufacturing a new type of friction clutch. It is suitable for all classes of machine tools, automobiles, gas engines, motor boats and countershafts, and in its construction no bolts, studs,

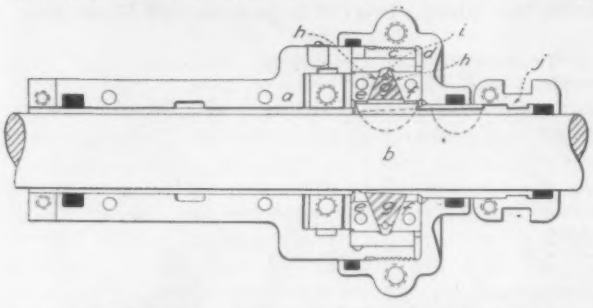


Fig. 1.—The Split Type of Reilly Friction Clutch Made by A. S. Baldwin & Co., Sharon, Pa.

nuts, hinge pins or toggles are employed. The working parts are entirely housed and protected against dirt and grit, while at the same time they are readily assembled, adjusted and removed. In action no end thrust on the shafts is created by the clutch, which, while providing a powerful clutching force, will at the same time slip if the load is too great for it. Fig. 1 shows the split type of clutch, while applications of the standard solid type

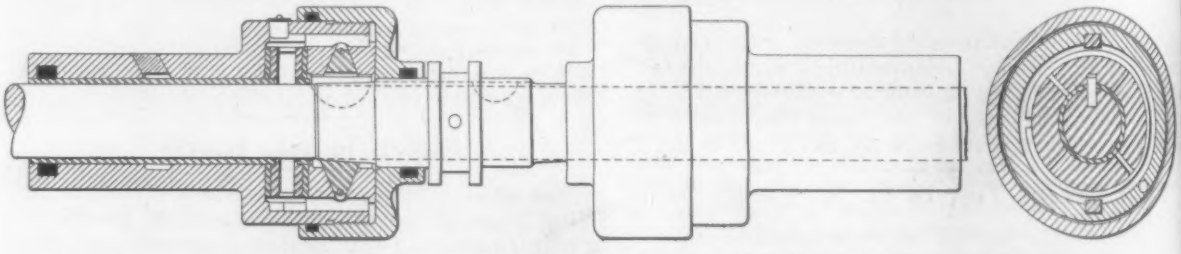


Fig. 2.—The Standard Clutch Used as a Two-Speed Countershaft.

are illustrated in the other three drawings. Fig. 2 shows the use of the clutch as a countershaft, with either two forward speeds or one forward and one reverse speed; Fig. 3 illustrates an application of the clutch to geared head machines, while Fig. 4 shows a two-speed forward and reverse countershaft with one belt.

The outside of the split clutch, Fig. 1, is perfectly smooth and as it is split into halves it is adapted to mill work in places where it is necessary to put the coupling on the shaft in the same way as a split pulley instead of taking the shaft down. As the essential features of the two types of clutches are the same the detailed description given of the split clutch applies equally as well to that of the solid one. The driven member *a*, which can be either a pulley or a spur gear according to the character of the transmission, is mounted loosely on the driving shaft *b*, and is coupled to the latter for rotation with it through the medium of friction devices. There is a housing chamber at one side of the driven member which contains all of the active friction elements of the clutch. This chamber is formed by projecting a laterally offset casing neck, *c*, from one side of the driven member. This offset part is threaded on its outer surface to engage with the internally threaded flange of the adjusting cap *d* which serves to close the chamber, in addition to furnishing a means for adjusting the friction elements properly. When the proper adjustment has been made this cap is fastened in position by a locking screw. The friction elements include a fast friction collar located inside the housing chamber at its base and fastened to the driving shaft. Friction washers are located on each side of this collar and on its outer side, between it and the body of the adjusting cap, is located the distinctive feature of this clutch. This special feature is the employment of a pair of spaced friction thrust collars, *e* and *f*, with an interposed expansible friction ring, *g*. These collars are keyed to the driven member by locking feathers secured in the inner wall of the casing neck *c* and engaging in notches formed in the peripheries of the collars at diametrically opposite points. In this way the thrust collars can be securely coupled to the driven member so as to turn with it, while at the same time they are free to move laterally under the influence of the friction ring.

The inner of the thrust collars is located next to the outer friction washer of the shaft collar and the other bears against the inner side of the flanged adjusting cap. These collars are constructed in duplicate and have dished contact faces, *h*, in their opposing sides which register with the inclined sides of the friction ring. This ring is of peculiar construction and consists of a spring band, *i*, surrounding a circular series of segmental clutch blocks. These blocks are of triangular or conical shape and have a groove in their apices forming a continuous seat for the spring band. The friction ring is intended to be keyed or feathered to the driving shaft by providing the ring with a key groove in one of its segments to receive the main shaft key or feather which is secured fast in the driving shaft.

Under normal conditions the ring is contracted and the friction elements are left loose enough to free the driven member *a* from the shaft *b*. The expansion of the friction ring between the thrust collars, which results in forcing these collars laterally into a frictional engagement with the fast shaft collar and the adjusting

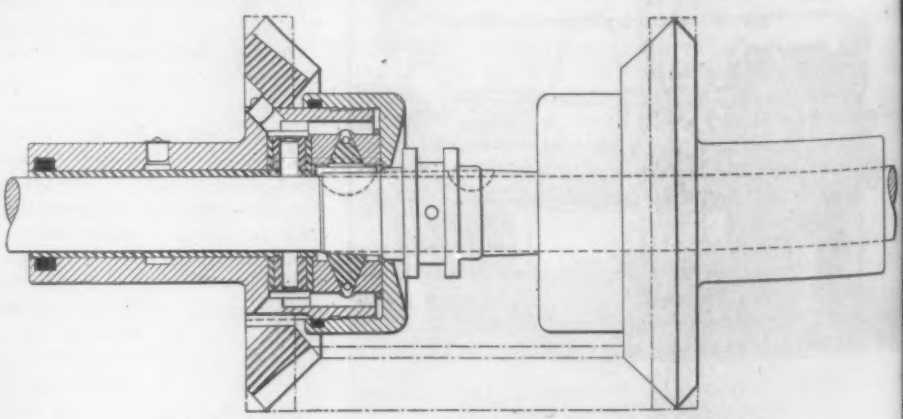


Fig. 3.—An Application of the Clutch to a Geared Head Machine.

cap of the driven member, engages the clutch and presses the driven member tightly upon the shaft collar. The expansion in the friction ring is secured by the movement of a shiftable slide collar mounted on the shaft which can slide along the shaft but is compelled to turn with it. This collar has a grooved hub, *j*, which is designed to receive the usual shipper lever, and at each side of this hub the collar has a taper wedging gland that

s adapted to be thrust through the outer friction collar and into the friction ring *g* inside of the circle of segmental clutching blocks. When the wedging gland is withdrawn from the friction ring the spring band *i* contracts the ring, thus disengaging the clutch.

If desired the slide collar can be so arranged as to alternately engage and disengage the individual clutches or both can be disengaged at the option of the operator. The solid clutches used in Fig. 4 are suspended from the ceiling, as shown, to avoid sudden shock.

Five sizes in all of clutch are made for shafts ranging from 1 5-16 to 2 15-16 in. in diameter. The smallest clutch which is capable of transmitting 4 hp. at a speed of 200 rev. per min. has an external diameter of 3 15-16 in. The outside diameter of the largest clutch which is capable of transmitting 16 hp. is 8¾ in.

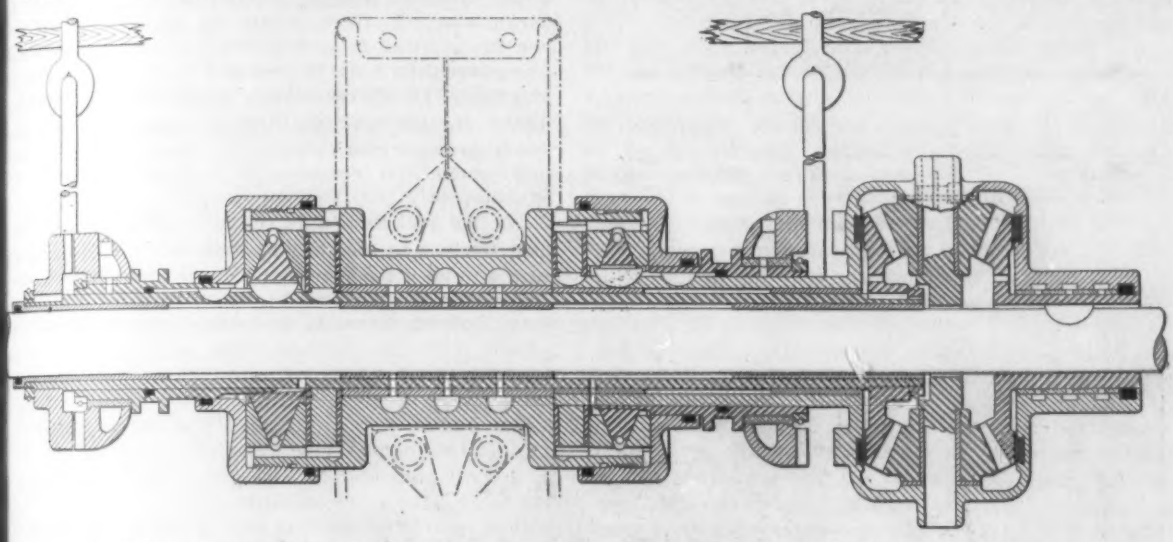
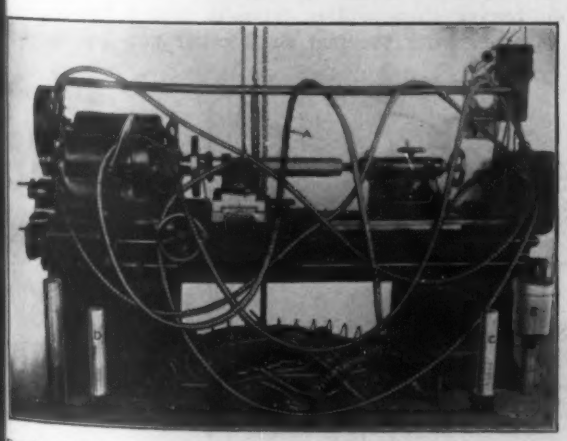


Fig. 4.—Clutch Giving a Two-Speed Forward and Reverse Motion for Countershafts with One Belt.

A Recent Test of O. K. Tools

A special outfit for testing new steels as soon as they are placed on the market has been fitted up by the O. K. Tool Holder Company, Shelton, Conn. The testing outfit is very complete and consists of a high powered motor driven lathe, a wattmeter to indicate the exact amount of power consumed at all times, a cut meter to show the speed of the cuts taken and a scale for weighing the amount of chips removed. In addition to testing new steels the plant has been also used to show the comparative merits of the tool holders made by this company which use inserted steel cutters as compared with solid forged tool holders of other manufacturers.



Results of Recent Tests of O. K. Tools Made by the O. K. Tool Holder Company, Shelton, Conn.

The long chip A is 65 ft. in length and was taken from a piece of oil treated steel at a speed of 75 ft. per minute. The composition of this steel was 3.5 per cent. nickel and 0.4 per cent. carbon. One of the maker's size C tools in a ⅝ x 1¼ in. holder was used and reduced the diameter of the shaft 1 in. with a feed of 0.025 in. The diameter of the cast iron piece B was reduced 9-16 in. in 60 seconds at a cutting speed of 165 ft. per minute and a feed of 0.1 in. The tool used in this case was a size C No. 11 right hand tool and the amount of metal removed was 10 lb. C is a bar of machinery steel 3¾ in. in diameter, from which a cut 15 in. long was taken in 3 minutes at a cutting speed of 175 ft. per minute. The amount of metal removed in this case was 16 lb., or 5 1-3 lb. per minute. The piece D was finished at a speed of 385 ft. per minute, a cut 1-16 in. deep and 15 in. long being taken in 1 minute. In all of these tests size C tools in a ⅝ x 1¼ in. holder were used and in making some of them as high as 25 hp. was consumed.

Exports Increase Heavily

The official statement of imports and exports of the United States in January, just completed by the Bureau of Statistics of the Department of Commerce and Labor, shows exports of $197,060,557, against $144,461,435 in January of last year; imports, $130,283,223, against $133,670,278 in January of last year. The excess of exports over imports is $66,777,334, against $10,791,157 in January of last year.

For the seven months ending with January, exports are $1,256,792,956, against $1,084,686,910 in the corresponding months of the prior year; imports during the seven months are $893,763,376, against $891,193,710 in the same months a year ago. The excess of exports over imports during the seven months is $363,029,580, against $193,493,200 in the corresponding months of last year.

The share of imports entering free of duty in January, 1911, is 55.9 per cent.

The Croxton Motor Company, a reorganization growing out of the Croxton-Keeton Motor Company, Massillon, Ohio, has purchased the old plant of the Baker Motor Vehicle Company in Cleveland, which has been unoccupied for several years, and will remove its equipment from Massillon to Cleveland. The company has been incorporated with a capital stock of $250,000. It will manufacture taxicabs, commercial vehicles and trucks. Its new site is a five-story brick building with 45,000 sq. ft. of floor space. H. A. Croxton is president and general manager; J. P. Stoltz, New York, vice-president and Eastern sales manager; H. D. Michael, New York, secretary and treasurer. It is expected that but little new equipment will be needed.

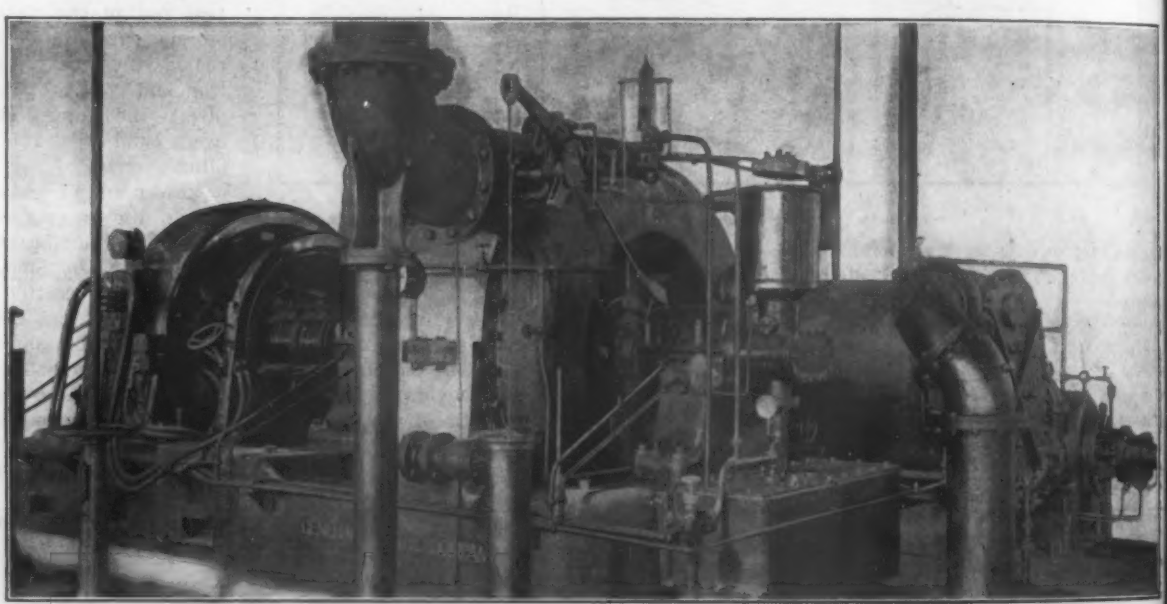
The Cleveland Alloys Company, Cleveland, Ohio, has been formed with a capital stock of $30,000, to manufacture solder under a new process, aluminum solder, bearing metal, and kindred products. The company has established a plant at 6816 Union avenue. M. I. Dryfoos is president and secretary; H. R. Dryfoos, vice-president and treasurer; R. H. Wall, manager.

An Interesting Curtis Turbine Installation

Details of the Turbo-Generator Set at the Bettendorf Axle Company's Plant

The growth of the plant of the Bettendorf Axle Company, Davenport, Iowa, rendered the installation of additional electrical equipment necessary about two years ago. A thorough investigation of the various prime movers suitable for driving generators was made at that time. The power equipment of the plant, which was run noncondensing, consisted of two 100-kw. direct connected high speed tandem compound engine driven units, a number of hydraulic pumps and an air compressor, all exhausting into a common header. This fact, as well as a consideration of the problem of heating the shop in winter, pointed to the low pressure turbine as the most suitable unit to install when reliability, simplicity, economy and maintenance were all taken into account.

As a result of this study the company decided to install a 500-kw. horizontal Curtis turbine, made by the General Electric Company, Schenectady, N. Y. The unit has been operating continuously for 14 hours a day ever since September, 1909, when it was put in service. The average load is 250 kw. and the current supplied by the generator is used principally for the operation of cranes and lifting magnets and for shop lighting. At the present time a number of new machines are being installed and when these are completed the power required will be approximately the capacity of the set, which is 500 kw.



The Low Pressure Curtis Turbo-Generator Set Installed at the Plant of the Bettendorf Axle Company, Davenport, Iowa.

The hydraulic pump exhaust furnishes the bulk of the steam required for operating the turbine, but as breakdowns to the system render the supply subject to interruption, a connection was made from the exhaust header to the high pressure steam line through a 4 x 8 in. Foster pressure reducing valve. In this way the amount of steam necessary to keep the turbine in operation is secured and the arrangement works satisfactorily, as the valve operates within a range of a ½-lb. drop in pressure. The average back pressure is about 3 lb., and a 12-in. relief valve, designed to operate at 5 lb. pressure, is located in the exhaust header to take care of any excessive back pressure. The entire steam supply for the turbine passes through an 18-in. two-stage separator, which eliminates all moisture and oil from the steam. The exhaust from the turbine is discharged into a 3150-ft. Worthington condenser and the condensed steam is returned to the boiler feed water heater.

Before the turbine was put in operation it was run for several days under varying loads, which were secured by the use of a water rheostat. These tests showed that the available supply of exhaust steam was sufficient to furnish 425 kw. continuously, while for short periods 575 kw. could be generated. At the time these tests were made six boilers of about 120-hp. capacity each were in service, and the results would indicate that from 75 to 80 per cent. of the energy delivered to the engines and the auxiliary machinery was recovered.

The regulation of the turbine is very good, as the variation in the potential does not exceed two or three volts with a load fluctuation of approximately 500 amperes. Inclosed and flaming arcs and mercury vapor and incandescent lamps constitute the lighting load, and better illumination is secured when the turbine furnishes the power than when the engine driven units are carrying the load. The increased lighting efficiency is due to the better regulation of the turbine. Testing of the emergency governor every week is a regular part of the operating routine. It responds to an increase in speed instantaneously and trips the stop valve on the turbine.

A few buckets of oil are drawn from the tank every two weeks and replaced by fresh oil, a practice which seems to keep the lubricant in good condition. Circulating water is employed to keep the bearings cool and practically no trouble has been experienced on this point. As it is very important that the flow of circulating water should be uniform, the supply is taken direct from the mains and passed through a reducing valve, which takes care of any pressure fluctuations in the supply main.

Comparative statistics show that the attention required by the turbine unit is not as great as that demanded by one of the engine driven units, having only one-fifth as much capacity. The good results which are obtained without using a receiver generator between the various units supplying the steam and the turbine are due to the employment of a reducing valve. This makes up for any deficiency in the steam supply due to the stoppage of one of the engines or pumps, and thus a sufficient supply of steam, which, if necessary, can be taken direct from the boilers, is secured. This arrangement results in making the installation fully as reliable as the high pressure steam engine or turbine and much more economical than either of them when running non-condensing.

Although no figures of the exact performance of the turbine are available, it is believed to be possible to recover 75 per cent. of the energy delivered to the pumps, compressors and reciprocating engines when running with a 28-in. vacuum, while in cool weather it has been possible to run for weeks with a vacuum ranging from 29 to 29½ in., which reduces the steam consumption even still further. It has been found necessary in order to maintain a good vacuum to pipe the steam seal in which

the carbon packing rings are located with high pressure steam to prevent any air from leaking in around the shafts.

The longest continuous run made with the turbine has been five days and nights, although the average amount of time it is in service is only 14 hours per day. Since its installation about 18 months ago no shut-down due to trouble of any kind with the turbine has occurred.

A Very Complete Foundry Trolley System

Details of an Installation at the Torrance Malleable Iron Company's Plant

The use of overhead trolley systems for handling raw material and finished products is becoming more general in foundries. The New Jersey Foundry & Machine Company, 90 West street, New York City, has installed a system in the foundry of the Torrance Malleable Iron Company, Troy, N. Y., which is very complete, and gives a good idea of the standard practice in this respect. Fig. 1 is a plan view of the plant showing the layout of the track, while Figs. 2, 3 and 4 show portions of the trolley system. Fig. 2 shows one of the heavy removable reinforced bottom, self-righting and self-dumping buckets used for handling coal, sand, coke, pig iron, scrap, castings, sprues, wasters, &c.; Fig. 3 is a view of a portion of the system at the right of the furnace, and Fig. 4 shows a switch and the overhead scale which is used for weighing various loads.

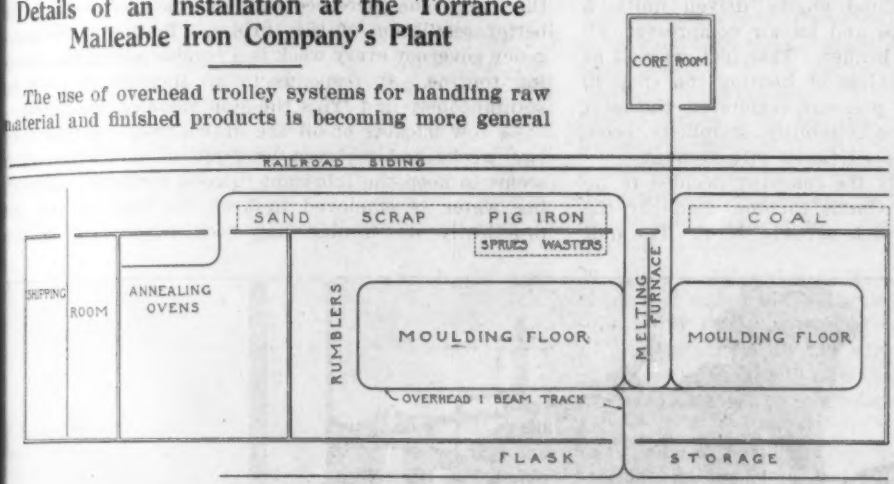


Fig. 1.—Plan Showing the Track Layout for the I-Beam Trolley System at the Foundry of the Torrance Malleable Iron Company, Troy, N. Y.

As will be noticed from Fig. 1 the flask storage yard is on one side of the main foundry building, the core room on the other, and the furnace is located near the center of the main building opposite the core room. The coke, pig iron, scrap and coal are stored on the side of the main building along the railroad track. The track for the overhead trolley system is a 7-in. I-beam of light section, having a carrying capacity of from 1500 to 2000 lb. There is approximately 2000 ft. of track around the plant, which enables practically all handling from the raw material to the shipping room to be accomplished by the overhead trolley, hand handling being used only to a very slight extent. The molten metal is taken from the furnace in bull ladles running on the track. Dorseys receive the metal from the ladle at the point of pouring and discharge it into the molds. Branches of the system run to the flask storage yard, the core room; the coal, pig iron and coke storage piles; the annealing ovens and the rumbling barrels.

A special skip, which allows greater control in dumping, is ordinarily employed for handling castings from the molding bins to the rumbling barrels and the cleaning room. The cores are handled on a special shelf carrier with a top spring connection to eliminate vibration. The hight at which the track could be placed is limited by the depth of the roof trusses in the foundry, and this has made it necessary to construct a section of the core room branch which passes over the railroad siding, so that it could be raised to clear box cars. An independent system having a capacity of more than 1000 lb. serves the shipping room, and there is a short section of track over the furnace with a trolley and air hoist for charging purposes and handling bungs.

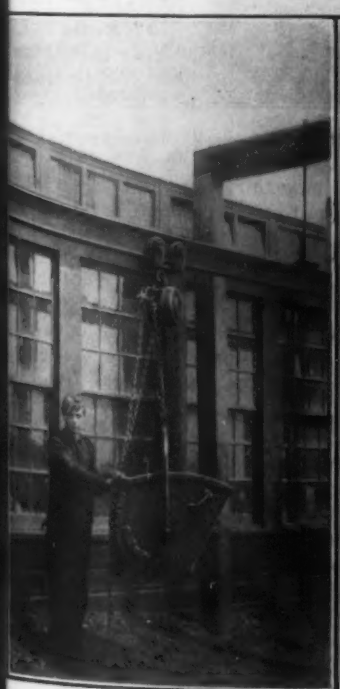


Fig. 2.—One of the Buckets Used.

Fig. 3.—The Track Near the Furnace.

Fig. 4.—A Switch and the Overhead Scale.

Three Views Showing Portions of the Trolley System.

An Unusual Standard Press Installation

A Three-Press Combination Equipment for Piercing Long Pieces

For piercing pieces of unusual length such as angle irons and long flat plates, which cannot be handled in a gang piercing press the Standard Machinery Company, 7 Beverly street, Providence, R. I., has developed a novel press installation. The equipment consists of three presses, one stationary and the other two movable, all mounted on one bed. Fig. 1 is a front view of the installation, and Fig. 2 is a three-quarter or side view.

The presses are of the open side type, and the frames are a modification of the company's No. 7-S press. The middle unit is positively fixed at the center of the bed, while those on either side are fed by a square thread screw actuated by a crank and slide over a dovetail planed in the bed. Each of the presses is fitted with a gib and powerful clamping screws on the back for holding them positively in place. In setting the movable machines a taper draw key with a set screw in the end is employed, the screw acting to force the key out of place when a change is desired. This range is a wide one, and on the particular work for which the equipment was designed there are six different settings in which the minimum and maximum distances between the center of the middle press and those of the side ones are 22 and 43 in., respectively.

The square thread feed screw employed to adjust the presses turns in a hole in the bed, and beneath the outboard presses at the back of the hole is a bronze nut. The bearing of the nut on the screw is 3 in., and the opening in the former is threaded with square threads of ¼-in. pitch and the same diameter as the screw. The bed is 6 in. thick, and the dovetail on which the side presses slide is 9 in. wide at the top. A forged steel crank is used for feeding the presses, and the key for locating them in position is 6 in. long, and is made from 1¼-in. square stock. The bed is set on eight legs, and there are slots cored through to allow the pieces to drop into boxes or carriers.

These presses can be operated either singly or in unison, and in the latter case a single treadle which connects the three individual ones is used. When the presses are being operated singly a lever at the side of each machine does the tripping. A special countershaft with five hangers enables the machines to be run back and forth while the balance wheel is running. The center press has a countershaft driving pulley with a face 4 in. wide, while those for the outer presses are 18 in. wide, which is the limit of their travel on the bed. The special countershaft is fitted with both tight and loose pulleys for a belt connection with the main line shaft.

The hight of the table from the floor is 40 in., and the overall hight of the equipment is 6 ft. 8 in., and the overall length is 7 ft. 6 in. Each press has a balance wheel 23 in. in diameter and 3¼ in. wide, weighing 200 lb. The stroke is 1½ in. long; the width between the gibs, 4½ in.; the width of the opening at the back of the frame, 7 in., and the adjustment, 1½ in. The bolster plate of each press is 16 in. wide, and 8½ in. deep and 2 in. thick. The speed at which the presses normally operate is 100 rev. per min.

Fig. 2.—Side View of the Triple Press Installation.

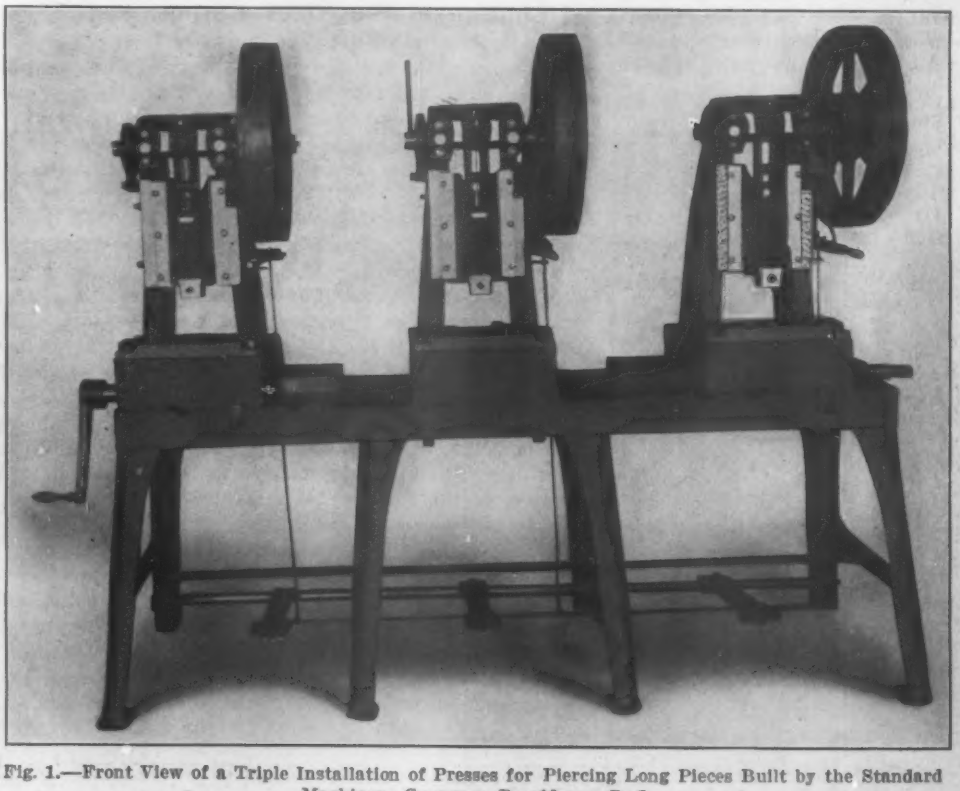


Fig. 1.—Front View of a Triple Installation of Presses for Piercing Long Pieces Built by the Standard Machinery Company, Providence, R. I.

Duff Jacks at Buenos Aires.—A notable exhibit at the late Buenos Aires Exposition was made by the Duff Mfg. Company, Pittsburgh, Pa., who showed every type of jack it manufactures, including the widely known Barrett track and car jacks. These jacks had already been in extensive use in Argentina, as in other foreign countries. The name Barrett, as identified with the Duff product, was registered with the Government of Argentina in 1908.

The Busch Power Sprue Cutter

A new design of power driven sprue cutter has been developed by J. C. Busch, 136 Ferry street, Milwaukee, Wis. The machine is built principally for cutting gates, runners and risers on steel castings and also for trimming fins. Fig. 1 is a front view and Fig. 2 is a side view giving details of the operating mechanism. As will be noticed from these two views, the construction is very heavy. It is claimed that the machine will do more work within its capacity than eight men, while at the same time the amount of grinding is reduced, as clean cuts close to the casting can be made.

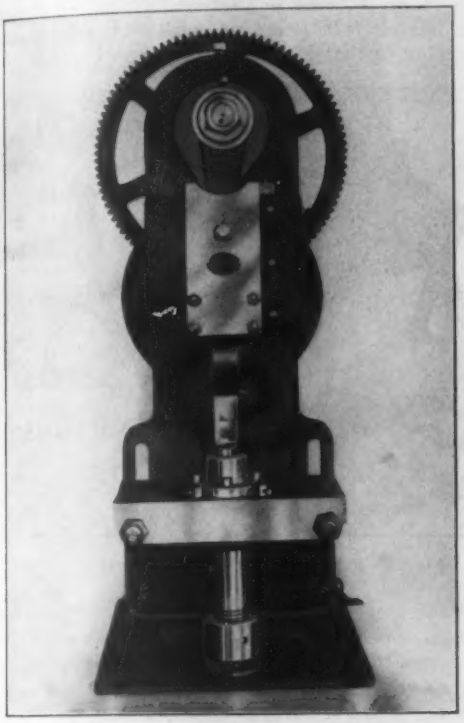


Fig. 1.—Front View of a Power Sprue Cutter Built by J. C. Busch, Milwaukee, Wis.

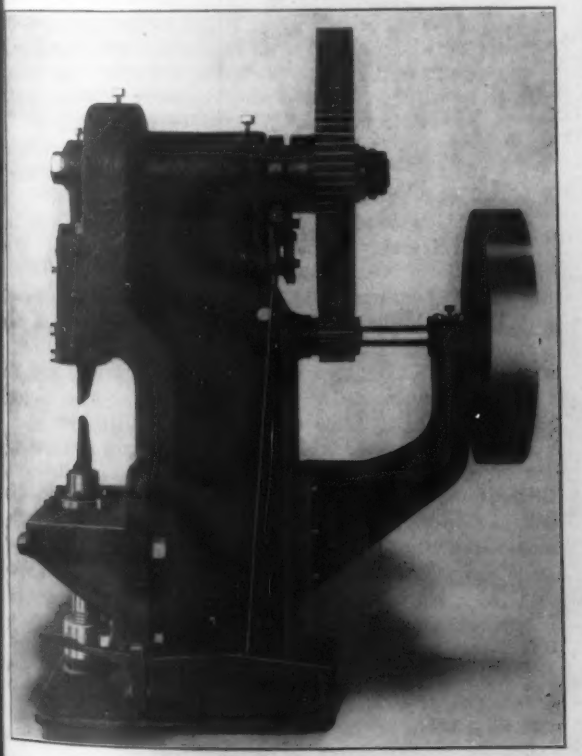


Fig. 2.—Side View, Showing Details of Operating Mechanism.

In the construction of the cutter high grade material is employed throughout. The frame, flywheel and back brackets are of cast iron, and steel castings are used for the gears, connecting rods, cross head and table. The shafts are of forged high carbon steel and have bronze bushings fitted into seats bored in the castings. The gears are cut and the knives are made of 3-in. square steel, with a cutting edge extending across their entire width. The cost of keeping these knives in good condition is said to be far less than for chisels doing the same work, as they will run from three to four weeks without regrinding. Three sets are furnished with each machine.

The machine is driven by a 10-hp. motor or its equivalent, and with a flywheel speed of 200 rev. per min. makes 30 rev. per min. At this speed it will take care of an output of from 10,000 to 12,000 lb. per day. The table has a screw adjustment and a motion of approximately 8 in. The capacity of the machine is 1½-in. square stock or its equivalent, but a piece of 0.3 per cent. carbon steel measuring 1¾ x 3½ in. has been successfully cut.

The following table gives the principal dimensions and specifications of the machine:

Depth of throat, inches	9½
Gap, inches	27
Hight of frame, inches	94
Overall hight, inches	114
Width of table, inches	29
Motion of table, inches	8
Size of knives, inches	3 x 3
Cutting edge, inches	3
Capacity of cutter for square stock, inches	1½
Diameter of flywheel, inches	36
Face width of flywheel, inches	6
Speed of flywheel, revolutions per minute	200
Power required, horsepower	10
Speed of machine, revolutions per minute	30
Weight of machine, pounds	10,000

This machine can also be used in a crucible foundry to cut runners and gates into suitable lengths for the next heat and thus reduce the amount of handling and the storage space required to a minimum.

Additions to the Steel Corporation's Fleet

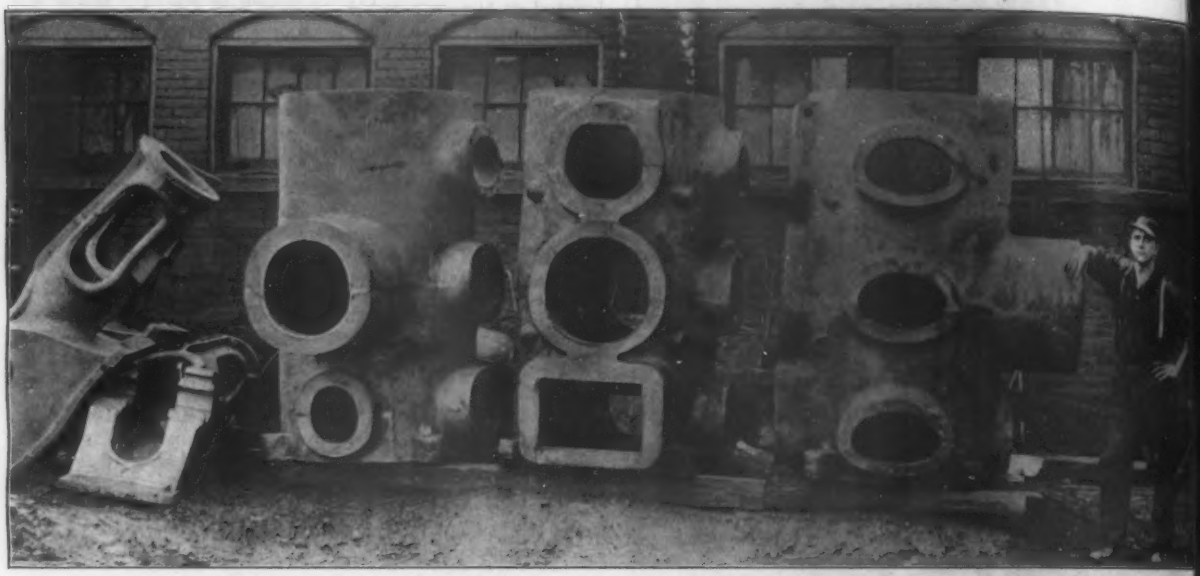
The sale to the Pittsburg Steamship Company of three freight steamers belonging to the Western Transportation Company adds what are among the best of the independent vessels of the lakes to the Steel Corporation fleet. These ships are new, cost something like $600,000 each to build, are 606 ft. long over all, have carried coal cargoes to Duluth of 13,500 net tons and 450,000 bushels of wheat from that port, and are most modern in every respect. The three are good for 36,000 gross tons of iron ore at a trip, or about 750,000 tons for a season of navigation. They were doubtless bought at a bargain, as the deal was made at a time when 1911 prospects for independent vesselmen on the lakes were at low ebb and the owners were not heavily interested in the control of freights for their ships. The three boats, formerly known as the Mills, Kerr and De Graff, have been renamed, respectively, the Filbert, the House and the Crawford, after officers of the United States Steel Corporation and subsidiaries.

To-day the tonnage aspect of the lake situation for 1911 is improving materially and there will probably be a fair business for most of the independent ships built. Aside from two tremendous vessels for the Shenango interest, each 617 ft. long, little is under construction in lake yards, aside from replacements and special class ships—passenger boats, oil barges, tugs and the like. With a good grain crop next fall in the Northwest, advance prospects for which are now far above the average for this time of year, there will be good business all season for lake bulk carriers.

By completing the steamship Corozal for the New York & Porto Rican Steamship Company in 17 weeks, the Newport News Shipbuilding & Drydock Company, Newport News, Va., claims to have broken the world's shipbuilding record. The Corozal is a freight liner, 347 ft. long, costing $500,000, and will be employed between New York and Porto Rico.

Cylinder Castings Made on a Mumford Molding Machine

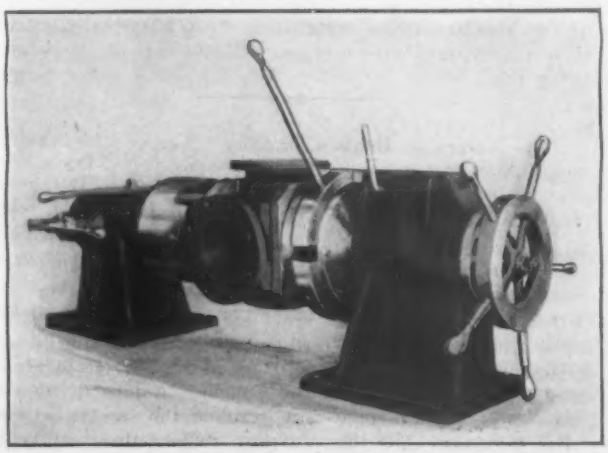
In the description of the additions to the Laidlaw-Dunn-Gordon Company's plant which appeared in *The Iron Age*, February 9, 1911, on page 383, a mistake was made regarding the name of the jarring machines installed in the foundry. The name of these machines was incorrectly given as Mumford & George. The equipment was furnished by the Mumford Molding Machine Company, 30 Church street, New York City, and consists of one 16-in. jolt ramming machine with a table 6 ft. square and a capacity of 9000 lb., and a 32-in. machine with a table measuring 6 x 9 ft., and having a capacity of 40,000 lb. These machines are employed to produce a great variety of molds of all sizes and shapes, and the first castings made from molds rammed on the larger machine are illustrated herewith.



First Castings Made at the Laidlaw-Dunn-Gordon Plant on a 32-In. Jolt Ramming Machine Built by the Mumford Molding Machine Company, New York City.

The Murchey Revolving Chuck

A new quick action revolving fitting and valve chuck, capable of attachment to a tapping machine, boring mill, drill press, &c., has been brought out by the Murchey Machine & Tool Company, Detroit, Mich. This chuck is designed to hold fittings and valves ranging from 4 to 10 in. in diameter, as well as flanged fittings. Although a similar tool for holding fittings and valves ranging from 1 to 5 in. has been made by this company, the new chuck, in addition to accommodating larger sizes, possesses a compensating gripping chuck holder, shown at the left side, which is an important feature.



A New Revolving Chuck for Fittings and Valves Made by the Murchey Machine & Tool Company, Cleveland, Ohio.

This holder enables any kind of fitting or valve of uneven surface to be held rigidly, the gripping being effected by a double trunnion arrangement, with a four-point trunnion chuck holder fitted on the face of the barrel. The fittings and the gripping heads are the only revolving parts. The chuck has antifriction thrust bearings, which insure easy motion when moving the fitting from one index point to another. If desired a valve or fitting having four openings can be tapped complete at one setting during each revolution of the chuck. When changing work in the chuck it is not necessary to screw and unscrew the entire diameter of the valve or fitting, as the operation is very simple and can be quickly accomplished. One stroke of the tap lever enables the chuck to be thrown wide open after the screw pressure is released by a short turn of the hand wheel and the pin at the left near the small lever drawn.

In the standard type of chuck there are only four slots, but it can be furnished if desired with eight slots for tapping at an angle of 45 degrees. Cold rolled steel is employed for the center spindles; the pilot wheel is of cast iron, with cold rolled steel handles, and the index head is of cast iron.

Long Distance Transmission of Steam

The University of Wisconsin, Madison, Wis., has issued bulletin No. 347, entitled "Long Distance Transmission of Steam and Its Effect on Power Plant Economies." This bulletin was prepared by H. J. Thorkelson, associate professor of steam engineering, for the purpose of calling the attention of steam engineers to the high efficiencies attainable in transmitting steam over considerable distances. After the discussion of the amount of energy that is unavoidably lost in changing a given quantity of energy in one form to the same amount in some other, the efficiency of the various parts of a steam plant are taken up. Following this, the effect of varying their loads upon the efficiencies of different portions of the plant are discussed. Efficiency curves for the various parts of a plant are included in the bulletin, as well as a curve showing the change in the total efficiency of the plant due to varying the load on the various parts. Curves showing the comparative total efficiencies of steam and electric systems of transmitting energy for various conditions are also included. The data upon which these curves are based were obtained from a test of a superheated steam pipe line 1200 ft. long.

The Raydiant sidewalk lights, manufactured by the Berger Mfg. Company, Canton, Ohio, have been installed in all courts of the new 11-story Onondaga Hotel in Syracuse, N. Y.

Fuel Handling on the Chelsea Piers

The use of a narrow gauge railway for interplant transportation is not a new institution. In larger factories this system has been in use for a number of years, and lately similar methods are being employed in boiler rooms. Instead of shoveling coal from bins or from the floor into the furnaces, it is now possible to see model

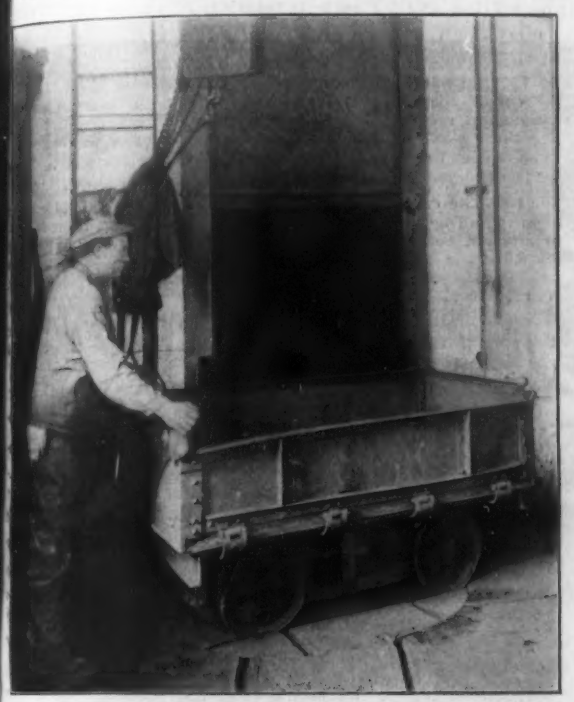


Fig. 1.—Industrial Railway and a Swiveling Wheel Base Car Installed on the Cunard Line Pier by the Orenstein-Arthur Koppel Company, Pittsburgh, Pa.

boiler and furnace rooms where dirt and waste have been reduced to a minimum and economical methods save time. A notable example of this use of the industrial railway is at one of the Chelsea piers on the North River front of New York City. This pier was built by the municipality, and is leased to the Cunard Line. Fig. 1 shows the industrial railway and one of the swiveling wheel base cars installed by the Orenstein-Arthur Koppel Company, Pittsburgh, Pa., and Fig. 2 is a view of the interior of the boiler room showing the coal being shoveled from the cars directly into the furnace.

A narrow gauge railway has been built in the boiler room to facilitate the handling of the fuel used in the boilers furnishing the power for operating the numerous pieces of machinery employed in loading and unloading the vessels. A single cast plate track is laid about 8 ft. from the furnace doors, as shown in Fig. 2. These boilers are built like a row of huge hogsheads down the center of the room, and the track encircles the entire battery. The turns at each end of the boiler room are made by turn tables, one of which is shown in Fig. 1.

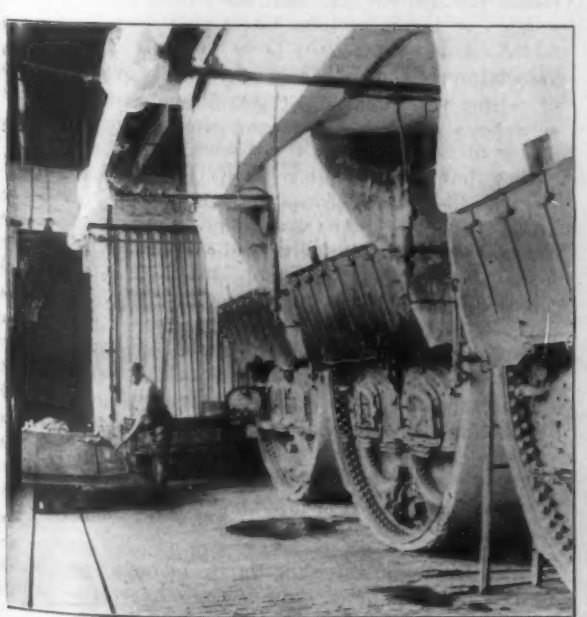


Fig. 2.—Shoveling the Coal Directly from the Car Into the Firebox.

The coal for the furnaces is loaded on the cars from large bins at each end of the room, the opening being located at the turn table, as shown in Fig. 1. When the car is filled it is easily pushed along the track by one man. These cars are about 5 ft. long and 2 ft. wide, and one side is an adjustable drop. When the car is stopped in front of a furnace door, this side is lowered and a stoker shovels the coal from the car directly into the firebox, which saves time and also keeps the floor clean. The car travels along past the various boilers and when empty is pushed around to the rear, thus making room for newly loaded cars and enabling the emptied one to be refilled.

In operation this system of fuel handling is said to have been very successful. The amount of coal formerly wasted by being spilled on the floor is saved and the efficiency of the boilers is thus increased. As the coal is always ready for use when wanted, there is also a considerable saving in the amount of labor required to fire the boilers.

The New York State Steel Company

At the annual meeting of the New York State Steel Company, held in Buffalo, January 20, the following directors were elected: Frederick N. Beegle, Beaver Falls, Pa.; Frederick Davidson, Pittsburgh, Pa.; George Davidson, Beaver, Pa., and Spencer Kellogg, Seymour Knox, John D. Larkin and William H. Love of Buffalo. The officers elected were: President, Wm. H. Love; vice-president, Frederick Davidson; secretary and treasurer, George Davidson. The Executive Committee consists of Wm. H. Love, chairman; Frederick N. Beegle and Spencer Kellogg.

Joseph A. Durfee was made general superintendent, effective February 20. He was formerly with the Tennesee Coal, Iron & Railroad Company and with the Colorado Fuel & Iron Company, having been general superintendent of the latter. Prior to his connection with these two companies Mr. Durfee was with the Otis Steel Company. F. E. Porter was made sales manager, with headquarters at Buffalo.

During the year the New York State Steel Company has added a standard 65-ton open hearth furnace to its plant. Its blast furnace, which has been out for relining and repairs since about the first of the year, will be blown in February 25. All departments of the company will be in full operation at that time, including the blast furnace, open hearth plant and billet mill.

Louis R. Davidson, formerly secretary and treasurer of the company, is now in charge of the mining operations of the Davidson Ore Mining Company, whose properties are on the Menominee range, near Iron River, Mich. He is secretary, treasurer and general manager of the latter company.

The American Brass Company's Year.—The American Brass Company reports for the year ended December 31, 1910, net earnings of $1,264,581, as compared with $1,089,584 in the year previous; total expenditures, $1,205,937, compared with $1,061,958 in 1909; and surplus of $58,644, contrasted with $27,626 in 1909. Net earnings of the subsidiary companies of the American Brass Company for 1910 amounted to $1,887,005, an increase of $119,459. Dividends received from subsidiary companies in 1910 amounted to $1,069,800, as against $1,075,481 in 1909, while the amount paid in dividends was $900,000, as compared with the same amount in the year previous. The total surplus of the subsidiary companies December 31, 1910, was $12,250,732, with a contingent reserve of $1,000,000.

A Model Compensation Code

As Compiled by the Conference of Commissions After the Long General Discussion at Chicago

The proceedings of the Conference of Commissions on Compensation for Industrial Accidents, held at Chicago last November, have just been published by Amos T. Saunders, the secretary, Clinton, Mass. The report contains a great deal of material of interest to students of the subject, which is now receiving important attention in various States, where the passage of compensation acts is contemplated. Of much value is what is termed the "Conference Uniform Draft of an Employees' Compensation Code."

The importance of the conference may be realized from the representative nature of its membership, comprising the United States Employers' Liability Commission, the Illinois Employers' Liability Commission, the Massachusetts Commission on Compensation for Industrial Accidents, the Minnesota Employees' Compensation Commission, the Employers' Liability Commission of Montana, the New Jersey Employers' Liability Commission, the New York Commission on Employers' Liability, the Employers' Liability Commission of Ohio, the Commission on Compensation for Industrial Accidents of Washington, the Wisconsin Industrial Insurance Committee, a special delegate from Connecticut, the Special Committee on Uniform State Laws to Prepare a Uniform Workmen's Compensation Law, and the United States Bureau of Labor.

The Uniform Draft of an Employees' Compensation Code

This is intended to be a basis for legislation in the various States. In the first section it provides:

The right to compensation and the remedy therefor, herein granted, shall be in lieu of all rights and remedies now existing, either at common law or by statute, either upon the theory of negligence or otherwise, for the injuries covered by this code; and no other compensation, right of action, damages or liability shall hereafter be allowed to either the injured or dependents for such injuries, so long as this code shall remain in force, unless, and to the extent only, that this code shall be specifically amended.

The amendment implies that existing laws be so changed that all rights to sue under the common law shall be eliminated. In many States this means that the constitutional rights of the workman, apart from those given him by statute, in employers' liability acts, shall be abrogated, by constitutional amendment or otherwise. Without such action the purpose of many advocates of workmen's compensation to make it an exclusive remedy would not be carried out.

Section 2 provides that "every employment in which there occurs hereafter to any of the employees personal injuries arising out of and in the course of such employment is for the purpose of this code hereby declared a dangerous employment, and consequently subject to the provisions of this code, and entitled to all the benefits thereof."

Section 3. Every employer engaged in such dangerous employment shall be subject to the provisions of this code and shall pay compensation according to the conditions herein named to every such employee so injured in his employment, or, in case of death caused by such injuries, to the dependents, for all personal injuries received by such employee arising out of and in the course of such employment, and disabling such employee from regular services in such employment, and not purposely self-inflicted to obtain compensation; but on the condition that, in case of dispute between the parties as to the injury or any of the matters herein named relating thereto, the controversy shall be brought before and determined by the Board of Arbitration.

Section 4. No compensation shall be allowed for the first two weeks after injury received, except that covered by sections 5 and 6, nor in any case unless the employer has actual knowledge of the injury or is notified within a period specified.

Sections 5 and 6 state that the employer shall provide reasonable medical and hospital services and medicines not to exceed $100 in value; and in case of death funeral expenses not to exceed $100.

It should be noted that two weeks is the limit set, a factor which reduces the liability greatly as compared with a one-week period.

Section 7. In case the injury causes death within the period of ..... years, the compensation shall be in the amounts and to the persons following:

(a) If there be no dependents, then the medical and funeral expenses.

(b) If there are wholly dependent persons at the time of death, then a payment of ..... per cent. of the first ..... dollars of the weekly wage and ..... per cent. of the balance of such wage, to be made at the intervals when such wage was payable, and to continue for the remainder of the period between the death and the end of the ..... years after the occurrence of the injury, but in no case to continue longer than ..... years after the injury or to the amount of more than ..... thousand dollars on account of the compensation for the injury to that person.

(c) If the deceased leave only persons partially dependent, they shall receive only that proportion of the benefits provided for those wholly dependent which the amount of the wage contributed by the deceased to such partial dependents at the time of the injury bore to the total wage of the deceased.

(d) The entire compensation granted by the code in case of death shall be paid to one of the following persons, if dependent, who shall be entitled to receive such payments after the due date, in the order in which they are named: (1) Husband or wife, as the case may be. (2) Guardian of children. (3) Father. (4) Mother. (5) Sister. (6) Brother. Payment to a person subsequent in right shall be lawful, and shall discharge all claim therefor if the person having the prior right has not claimed the payment prior to the time when the same is in fact made.

Further detailed provision is made for the application of payments. In cases of total temporary or total disability, section 8 makes provision similar to that governing compensation for death, the limits being left unfixed, to be filled in by individual statute. In case of temporary or permanent partial disability the employee shall receive .... per cent. of the decrease of his earnings during the continuance thereof, but not to continue more than .... years in time from the injury or to amount to more than .... thousand dollars.

When the employee is employed at the time of the injury in a regular capacity at a fixed and reasonable wage, which remains unaltered substantially throughout the year, either in his own case or in the case of persons engaged in the like employment, the wage taken as the basis of compensation under the foregoing sections shall be the wage he is actually receiving. Where the employee is at the time of his injury employed other than as above, the wage so taken shall be an average or fair wage which the particular employee ought to receive on a reasonable basis, considering the rate he has been getting, his ability and willingness to work, the nature of the service he was performing and all the other circumstances of the case.

An important paragraph, in view of various decisions handed down under the British act, follows:

If the employer shall clearly establish that the injuries, death or disability, was due in whole or in part to the employee's previous injuries, sickness, disease, physical ailments or deficiencies, age or infirmities, then and to that extent only the compensation allowed shall be correspondingly reduced; and if the employee or a beneficiary under this code shall clearly establish that the injured was a minor of such age and experience when injured that under natural conditions he would be expected to increase in wage, this fact may be considered in arriving at his reasonable wage.

Employers' Liability and Compensation Systems

Bulletin No. 90 of the Bureau of Labor of the Department of Commerce and Labor, recently issued, is devoted largely to the subjects of employers' liability and workingmen's compensation. An article by Lindley D. Clark summarizes the measures that have been taken recently by the United States Government and by several of the State governments, with the view of modifying the present laws covering these subjects. A brief description of the nature of liability and compensation systems is followed by a short history of Federal and State legislation regarding such systems, and this in turn by an account of the work up to the present time of various Federal and State commissions appointed to inquire into employers' liability and workingmen's compensation. The action taken by employers and associations of employers and workingmen is also fully shown, and the laws recently enacted by the State of New York relating to the same subjects are printed in full.

Another article gives the results of the recent confer-

ence in Chicago of State commissioners on the subject of compensation for industrial accidents, with the conclusions reached by the conference. A third article discusses and presents in summary from the important features of foreign workingmen's compensation systems at present in force in various countries. The summary covers altogether 26 countries which have by legislative enactment provided some system of compensation of workingmen in case of industrial accidents.

Still another article relates to the cost of employers' liability and workingmen's compensation insurance in the United States and various foreign countries. This article is the result of a study by Miles M. Dawson, the purpose of which was to ascertain the cost to employers for insurance against industrial accidents under the various systems of employers' liability and workingmen's compensation at present in operation in the various countries. The premium rates charged, usually in the form of percentages of the payroll, are given for a large list of industries for Austria, Belgium, Denmark, Finland, France, Germany, Great Britain, Italy, Netherlands, Norway, Sweden, Switzerland, Canada and the United States.

Workingmen's Compensation

The American Hardware Manufacturers' Association, of which F. D. Mitchell, 309 Broadway, New York, is secretary and treasurer, has invited A. Parker Nevin, attorney, 30 Church street, New York, to address the members of the association by letter on occasional subjects of current legal and industrial interest. Mr. Nevin's first contribution, which is designated as "Serial Letter No. 1," is on the subject of workingmen's compensation and is as follows:

"During the past two or three years employers of workingmen in this country, and society in general, began to investigate the principles under which compensation was paid to injured employees. These investigations disclose a condition of affairs mutually undesirable both to employer and employee. Under the present system of our various State laws, if a workingman contributed in any degree to the cause of his own personal injury he cannot by a lawsuit recover a penny of compensation. This rule is known as the doctrine of 'contributory negligence.' Again, if a workingman is injured, through no fault of his own, or his employer, but through the fault of a fellow workingman, he is denied recovery of compensatory damages. This principle is known as the 'fellow servant doctrine.' Moreover, if a workingman is engaged in an occupation which is obviously dangerous and inherently hazardous, and while so engaged becomes injured, he cannot recover damages, on the theory that he knew what he was doing when he entered such dangerous occupation, and that he shared in its risk. This is known as the doctrine of the 'extra hazardous risk.'

"It is to be noted that these rules are merely defenses which are legally available by the employer in the event of litigation. But men have begun to question the wisdom of such doctrines, and are seeking means to readjust the entire system of workingmen's compensation upon a basis of equal justice both to employer and employee. As a result of awakened public interest in this vast problem, some 10 States have special commissions working to discover if a new set of operating principles cannot be devised that will insure a limitation of pecuniary liability on the part of the employer and a beneficent rule of fixed, automatic compensation to the injured workingman or his estate, in case of death.

"Briefly stated, the current tendency is to abandon the 'defenses' referred to above and to substitute for personal liability on the part of employers, a liability on the trade or occupation of the employer. In pursuance of such a new relationship, if his trade or business is insufficient to meet the new liability so created, he, the employer, might have to insure by some method that will assure an injured workingman that his compensation is safe. Whether these two propositions—the new liability and compulsory indemnity insurance—are in harmony with the terms of our State and Federal constitutions cannot now be stated. It happens, however, that at this particular time a case (Ives *vs.* Buffalo Street Railway Company) is before the New York Court of Appeals, which will determine the validity and constitutionality of the Compulsory Compensation act, which went into effect in New York, September 1, 1910. The decision in this case is awaited with the greatest interest by all interested in the evolution of industrial accident reform, although, whatever the decision may be, an appeal to the Supreme Court of the United States will most likely be taken. Again, only a few days ago the Supreme Court of the United States handed down a decision which may have a definite relation to the problem of compulsory State indemnity insurance. I refer to the case in which the learned court held that it was within the power of the State to compel banks to set aside, as a guarantee fund, 1 per cent. of the daily deposits.

"Under the present status of this great legal, social and economic problem, every employer, business man and employee should be under the bounden duty to familiarize himself with the progress of the movement, and to do what he can to ameliorate the problem of our industrial life, which so imperatively needs reformation, to the end that a more human and enlightened spirit shall obtain between those who employ and those who are employed. The old order changeth, and it will not be long before the genius of American industrialism will have solved the problem sanely, fairly and honestly."

The American Can Company's Annual Report

The American Can Company's report for the year ending December 31, 1910, has been issued. The income account compares as follows:

	1910.	1909.
Earnings	$3,456,537	$3,301,678
Depreciation	633,564	545,526
Net profits	$2,822,972	$2,756,152

The general balance sheet as of December 31, compares as follows:

Assets.

	1910.	1909.
Plants, real estate, &c.	$73,199,038	$73,780,826
New construction	7,654,480	6,196,459
Other investments	856,209	881,572
Cash	1,377,417	2,080,218
Bills and accounts receivable	3,622,743	2,724,199
Merchandise inventory	4,084,026	4,773,882
Totals	$91,793,913	$90,437,157

Liabilities.

Preferred stock	$41,233,300	$41,233,300
Common stock	41,233,300	41,233,300
Accounts payable	949,997	996,067
Dividends payable	515,416	515,416
Contingent funds	1,072,012	430,494
Surplus	6,789,888	6,028,580
Totals	$91,793,913	$90,437,157

President W. T. Graham says: "The volume of the company's business in 1910 exceeded that of the preceding year by a substantial amount. This improvement was evident as early as January and continued through each of the 12 months, the last quarter making the most favorable showing in this respect. Earnings, however, were not relatively increased, some lines of product selling on a lower basis than ever before and only partially compensated for by improvement of manufacturing facilities and the greater efficiency of the organization. In addition to ordinary improvements and betterments, there was expended during the year, in the purchase of new properties and extension of existing factories, $1,458,020, and during this same period working capital was increased $551,956. In the estimate of the management, prospects for 1911 are assured and current conditions at the time of this report justify the expectation of good business. While competition has increased and is aggressive, the company's products are growing in use and new lines of output constantly being developed."

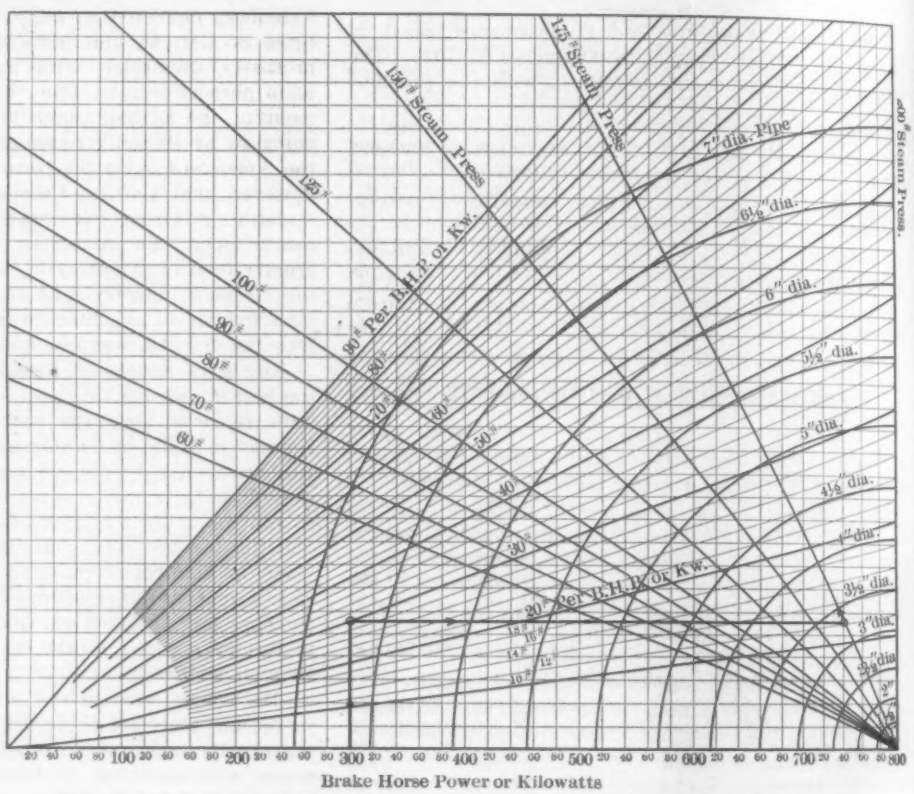
Steam and Exhaust Pipe Size Charts

Their Use Saves a Large Amount of Calculation

To eliminate the necessity of working out the sizes of steam and exhaust piping for each individual installation, W. J. A. London, chief engineer of the Terry Steam Turbine Company, Hartford, Conn., has prepared two charts which are reproduced herewith. Fig. 1 shows the chart used for determining steam pipe sizes, and Fig. 2 is the corresponding one for exhaust piping.

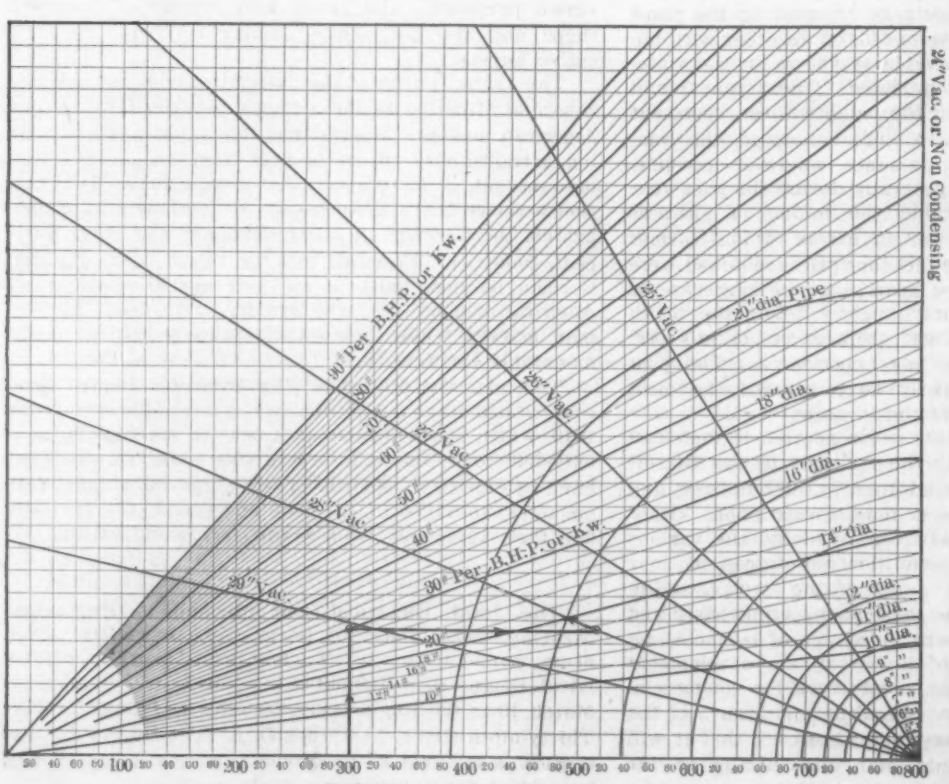
The sizes of the steam pipes are based on the standard steam velocity of 100 ft. per second, and the steam employed in making the calculations was supposed to be dry and saturated. The curves for the exhaust piping were based on the same figure for the atmospheric exhaust curve, and upon a steam velocity of 400 ft. per second for all the vacuum curves. In calculating all of these curves the steam was considered to expand from a pressure of 150 lb. gauge, and the entropy given by Peabody's steam tables, which were used throughout, is 1.56. Where the initial pressure differs from that assumed a small correction should be made for the difference in moisture in order to be theoretically exact. As a matter of fact, the percentage difference which occurs in ordinary work in expanding from either 100 or 200 lb. to 1 lb. absolute is so small that the curves will be sufficiently correct for all practical purposes.

When the power, water rate and steam pressure are given the size of the steam pipe can be obtained from a chart reproduced in Fig. 1 in the following way: Assuming a case in which a 300-hp. boiler generates steam at a pressure of 175 lb. and a water rate of 30 lb. per horsepower per hour the vertical line corresponding to 300 hp. is followed until it intersects the diagonal corresponding to a water rate of 30 lb. This point is carried horizontally to the right until it intersects the 175-lb. steam pressure line. The proper size of piping to use is determined by referring this point of intersection to the larger of the two arcs between which it is located. In this case the point of intersection falls between the arcs corresponding to pipe diameters of 3 and 3½ in., and the latter is the proper size of pipe to be used. To determine the size of the exhaust outlet when the power, water rate and either the back pressure or vacuum is given, the chart in Fig. 2 is used in the same way. In the particular case illustrated the horsepower and water rate are the same as in the previous instance, and the engine is supposed to exhaust into a 28-in. vacuum. In this case it will be found that proper diameter of the exhaust main is 18 in.



Brake Horse Power or Kilowatts

Fig. 1.—Chart for Determining the Size of Steam Piping Prepared by W. J. A. London, Hartford, Conn.



Brake Horse Power or Kilowatts

Fig. 2.—Exhaust Pipe Size Chart.

All of the pipe diameters given are based on the net internal area of the various sizes. Where extra heavy or double extra heavy pipe are used an allowance should be made as the net areas of these two grades are frequently considerably less than those of an ordinary pipe of the corresponding diameter.

The Chicago Pneumatic Tool Company's Annual Report

The Chicago Pneumatic Tool Company has issued its annual report for the year ended December 31, 1910. The income account compares as follows with the previous year:

	1910.	1909.
Net profits	$1,054,809	$558,927
Charges	166,733	168,150
Balance	$888,076	$390,777
Dividends	257,951	.....
Balance	$630,125	$390,777
Depreciation, &c.	193,149	140,168
Surplus	$436,975	$250,609
Previous surplus	1,072,174	821,564
Total surplus	$1,509,149	$1,072,174

The general balance sheet as of December 31 compares as follows:

Assets.

	1910.	1909.
Real estate, plant, &c.	$6,922,185	$6,825,716
Stock in other companies	1,121,669	1,203,257
Accounts and bills receivable	1,116,892	1,009,032
Inventory	1,109,835	938,379
Cash	241,966	18,296
Treasury stock	37,000	37,000
Sinking fund	600,787	521,644
Treasury bonds	200,000	200,000
Totals	$11,350,336	$10,853,324

Liabilities.

Capital stock	$6,485,800	$6,485,800
First mortgage 5s	2,500,000	2,500,000
Mortgage assumed	.....	45,000
Interest and dividends payable	122,388	57,829
Accounts payable	110,716	106,981
Reserved for taxes, &c.	12,495	3,896
Sinking fund	600,000	521,644
Bills payable	.....	60,000
Profit and loss surplus	1,509,149	1,072,174
Totals	$11,350,336	$10,853,324

President W. O. Duntley says in part:

"The balance of the mortgage assumed on the plant purchased in 1907 amounting to $45,000, together with the item of $60,000 of bills payable as shown in the statement for 1909, has been liquidated. The accounts and vouchers payable, shown in the balance sheet, represent current accounts which have since been paid, the company availing itself of discounts wherever possible. While business conditions generally during the past year were not unusually favorable, the volume of business secured by the company was in excess of any former year. Notwithstanding the fact that prices obtained were lower than prevailed a few years ago, the aggregate of sales for the year was only slightly below the maximum, while the net earnings are in excess of any previous year your company has experienced. The past year, therefore, may properly be considered the most prosperous in the history of the company.

"Practically all the plants were operated to their full capacity. During the year the facilities of the Detroit plant were increased by an addition to the buildings, and at present another addition is under construction. Other substantial betterments have been made to the various plants and their physical condition maintained to their usual high standard. . . . All of the foreign subsidiary companies are now on a self-supporting basis and experiencing a steady growth in volume of business and earnings. . . . Early in last year the development and manufacture of a light motor truck for commercial use was successfully begun, and while this branch of the business is yet in its infancy, indications are that it will rapidly develop and should add substantially to the future product and profits of the company."

German Machine Tools

Successful Adaptations of American Models—Competition with This Country

BERLIN, February 9, 1911.—The Association of German Machine Tool Builders has just held its yearly meeting here and it proved to be unusually interesting. Prof. Georg Schlesinger of the Technische Hochschule in Charlottenburg delivered an address on the fundamental features of German and American machine tool building, profusely illustrated with magic lantern views. His main purpose was to show the extremely rapid development of the German industry within 10 years, and in doing so he liberally recognized the fertile influence of the Americans upon the German methods. He claimed, however, that German thoroughness and application of scientific principles had succeeded in making improvements upon the American models, thereby securing greater facility in operation, and this, he said, had given the German industry a steady development. The German exhibit of machine tools at the Brussels World's Fair, he claimed, was one of the chief attractions there.

Dr. Ernst Schiess of Düsseldorf, the owner of one of the best known machine tool shops in Germany, followed with remarks upon the successful work in perfecting German methods of making machine tools—a result that was crowned with due recognition at Brussels. At the same time he pointed out the difficulties the industry had to contend with, owing to the high costs of production and the too low selling prices of machinery. The Germans, he said, must continue to improve and must give close attention to perfecting special machines. This was the only way in which the Germans could hold their own in foreign markets, where their success was endangered by high tariffs.

Dr. Schiess also gave a survey of business conditions in the machine tool trade, which he represented as having greatly improved within the past few months. The shops were described as being nearly all well supplied with work and their orders as being sufficient to last for some months. The brisk demand extended to machinery of all kinds, and it comes from both the home and the foreign market. Lathes, milling and boring machines and other staple models were meeting with ready sale, and the same was true of special machines for the most varied purposes. The heavy iron companies, electrical shops and the automobile making concerns were all active buyers.

The annual report of the association also devotes considerable attention to the struggle between German and American makers. It says that the Americans are making extraordinary efforts to hold their own in the German market, or to recapture lost ground here. It is further asserted that the Americans are making a hard fight against the Germans in Austro-Hungary and other European countries. From all this the report concludes that German builders must be on their guard against their American competitors, who are trying to flood the German market, while their own is protected by an insurmountable tariff wall.

This alarmist talk about the American danger, however, is not borne out by the German trade statistics for 1910, which show imports of American machine tools of only 3500 tons—this in a total of 6000 tons. On the other hand, Germany's exports of machine tools last year amounted to 59,000 tons, a gain of 11,000 tons over 1909, and their value rose from $14,100,000 to $17,500,000.

The Joint Electrical and Mechanical Engineers' Meeting.—The American Society of Mechanical Engineers, co-operating with the American Institute of Electrical Engineers, will hold a meeting on the evening of March 10 in the Engineering Societies Building, 29 West Thirty-ninth street, New York City. The subject for discussion is the cost of industrial power, and papers will be presented by members of both societies.

The New Find on the Cuyuna Iron Range

A floating note as to a recent discovery on the Cuyuna range, west of Duluth, has been causing some comment in the financial press. The statement, which is to the effect that a find of ore "better than Bessemer" has been made recently on lands belonging to the Weyerhaueser Timber Company, showed a great many million tons of ore and would enrich independent lessees, is much exaggerated. This find has been made on the S. ½ of the N. W. ¼ of section 11, T. 46, R. 29, in the center of the Cuyuna and near the new village of Ironton. As yet it is impossible to determine its importance. The ores of this new range lie in lenticular form in the steeply dipping ore bearing formation and may not have great length or width. It is therefore utterly out of the question to correlate any drill hole with others lying any considerable distance either way from it, even though these may be in the direct strike of the formation. Tonnage figures made in that way have met with disaster later. It is a fact that the depth of this ore deposit drilled by the Rogers-Brown Ore Company on its Weyerhaueser lease is considerable, being the deepest good ore yet found on the range, and the deposit is of great interest in that it shows a depth of 750 ft. from surface for good ore, and still ore. It was found at a depth of nearly 500 ft.; at first showed 200 ft. of non-Bessemer ore of medium grade and below that 80 ft. of Bessemer ore of good grade. Its length and width are not yet determined, but are liable to be considerable enough to make the tonnage of much importance.

So far the highest grade of ore ever found on the Cuyuna is probably on the S. E. ¼ of the S. W. ¼ of section 1, T. 46, R. 29, near Ironton and a little more than a mile from the above, where drill holes went into material running up to 65 and 66 per cent. iron, ranging between 0.016 and 0.030 per cent. phosphorus. Good enough for anybody, but the lessees abandoned the option after drilling, as they found the deposit to be mere narrow lenses cutting across the strike of the low grade material in the formation as a whole, and on the tract in question there was estimated to be less than 100,000 tons of this high grade ore, at considerable depth and difficult to mine. Original drilling on this 40 had seemed to show that this fine ore extended across the tract. This case is referred to merely to indicate how unsatisfactory and misleading partial drilling is and in no sense to militate against the possibilities of the district. For it is unquestionable that some very large ore bodies have been found there; in one developed mine levels have been run ½ mile in ore that is available for the furnaces.

A few hundred thousand tons will doubtless be shipped from the Cuyuna during 1911; exploration is now active there and will certainly extend for years to come. The area of the possible ore bearing region of that range is increasing with the continuation of dip needle work. The belief of those most closely connected with developments there is that many mines will be found that will rival the Mesaba in grade and will rank well up in tonnage.

Pig Iron Production in Canada in 1910

The pig iron production of Canada in 1910, as shown by the statistics of the American Iron and Steel Association was 740,210 tons (376,271 tons in the first half and 363,939 tons in the second half), against 677,090 tons in 1909, an increase of 63,120 tons, or over 9.3 per cent. The production in 1910 was the largest in the history of the dominion, 1909 coming next. Of the total production in 1910 724,174 tons was made with coke and 16,036 tons with charcoal and electricity.

The production of basic pig iron was 365,090 tons, against 357,965 tons in 1909, and the production of Bessemer pig iron, 221,494 tons, against 169,545 tons in 1909; the remainder was nearly all foundry pig iron. Basic pig iron was made in 1910 by four companies owning nine coke furnaces, and Bessemer pig iron by two companies owning four coke furnaces. All the basic and Bessemer pig iron was made with coke.

In 1910 the Canadian furnaces consumed 1,355,057 tons of iron ore and 98,853 tons of mill cinder, scale, &c., in the manufacture of pig iron. They also consumed 510,650 tons of limestone for fluxing purposes.

On December 31, 1910, Canada had 17 completed furnaces, of which 11 were in blast and 6 were idle. Of the furnaces in blast one was charcoal. Of the grand total 13 usually use coke for fuel and 4 use charcoal. In addition two coke furnaces were being built on December 31.

Trade of the United States with Canada

The pending reciprocity agreement with Canada lends interest to some figures just prepared by the Bureau of Statistics, Department of Commerce and Labor, showing the trade of the United States with Canada during a term of years. The total value of imports from and exports to Canada at decennial years since 1850 is as follows:

Fiscal year.	Total imports into United States from Canada.	Exports to Canada from the United States. Domestic.	Foreign.	Total.
1850	$5,179,500	$7,725,247	$1,790,744	$9,515,991
1860	23,572,796	18,657,029	4,038,899	22,695,938
1870	35,354,247	17,900,701	3,931,525	21,832,226
1880	32,988,564	26,757,478	2,702,779	29,460,257
1890	39,042,977	37,327,963	2,954,145	40,282,108
1900	39,369,074	88,030,336	7,289,634	95,319,970
1910	95,128,310	202,548,023	13,441,998	215,990,021

This statement includes trade between the United States and all the area now known as the Dominion of Canada, and in addition thereto, from 1850 to 1870, Newfoundland and Labrador, not separately stated prior to 1873.

Of the domestic merchandise exported in 1910 to Canada $21,000,000 represented the value of foodstuffs; $50,000,000 crude materials for use in manufacturing; $31,000,000 manufactures for further use in manufacturing, and $96,000,000 manufactures ready for consumption.

The principal articles forming the iron and steel exports to Canada in our trade with that country are shown in the table below:

Steel sheets and plates	$4,875,466
Automobiles	4,363,694
Structural iron and steel	2,828,338
Bars or rods of steel, except wire rods	2,390,235
Electrical appliances	2,356,325
Wire	2,136,653
Plows and cultivators	1,614,482
Pipes and fittings	1,618,181
Pig iron	1,137,357
Locks and hinges	1,272,969
Electrical machinery	1,151,449
Typewriters	1,266,650

Cooper Engine Contracts.—The C. & G. Cooper Company, Mount Vernon, Ohio, has been awarded contract by the Republic Iron & Steel Company for a 3000-hp. cross compound Cooper Corliss engine to drive its new Morgan continuous merchant mills to be installed at Youngstown, Ohio. The engine will be direct connected to the mills by means of steel return cranks. This engine is practically a duplicate of a Cooper engine of this type driving a mill at the International Harvester Company's South Deering Works. An order has also been received from the Carnegie Technical Schools, Pittsburgh, for a 75-hp. Corliss engine to be installed in the mechanical engineering department for testing and other experimental purposes. This engine will be equipped with a combination rope flywheel, the face of which will be grooved for seven 1-in. ropes. A brake wheel will also be mounted on the main shaft for power measurements and regulation tests. The engine will be built to run 150 rev. per min.

The Christmas distributions to employees by the Crane Company, Chicago, in the past 12 years have reached a total of $3,160,606.

Trade Publications

Gaskets.—Cincinnati Gasket & Packing Company, Cincinnati, Ohio. Pamphlet. Treats of the Triple and Trinity gaskets, which were illustrated in *The Iron Age* January 19, 1911. Prices are given of the various sizes of gaskets, and in addition space is devoted to the various types of packings made by this company.

Electric Welding Equipment.—Garwood Electric Company, Garwood, N. J. Bulletin No. 508 G. Treats of a line of electric welding equipment for either alternating or direct current. The special fields for which this equipment is adapted are street railway and locomotive shops and steel mills.

Air Compressor.—The Roberts Motor Company, Sandusky, Ohio. Bulletin D-2. Relates to the Roberts motor driven air compressor, which is made for either portable or stationary use. Its special features are a gear driven mechanical oiler, a rigid timer and a noiseless carbureter. The construction of this compressor is described at length and the text is supplemented by half-tones and line drawings. An illustrated description of the compressor appeared in *The Iron Age* January 12, 1911.

Water Meter.—A. M. Lockett & Co., Ltd., New Orleans, La. Pamphlet. Illustrations and descriptive matter explain the operation of the Tulane Pitot tube, which is designed for measuring the flow of large volumes of water in pipes and open channels.

Mechanical Lubricator and Air Compressor.—Ingersoll-Rand Company, 11 Broadway, New York City. Folder No. 515 and bulletin No. 3007. The first deals with the Heart Beat oiler for rock drills, which is operated by the pulsations of air in the supply pipe. The bulletin pertains to the class PB duplex power driven air compressor. The various features of the compressors are illustrated and described and a table of specifications completes the bulletin.

Resistance Material.—Driver-Harris Wire Company, Harrison, N. J. Catalogue H. Contains a number of quick reference tables and lists two new alloys known as Yankee Silver and Therlo, which have been recently perfected.

Screw Machines.—The National-Acme Mfg. Company, Cleveland, Ohio. Pamphlet entitled "The Production of Duplicate Parts." Deals with the manufacture of duplicate metal parts made from bars in large quantities. Traces the development of the manufacture of screws from a hand-forged hand-cut one made by a blacksmith to those turned out by the automatic screw machine. The various types of screw machines made by this company are illustrated as well as the special attachments used in connection with them. An illustrated description of the company's standard machine appeared in *The Iron Age* March 4, 1909.

Wrenches.—The Whitman & Barnes Mfg. Company, Akron, Ohio. Catalogue No. 79. Lists the entire line of drop forged wrenches made by this company.

Couplers.—Detroit Steel Casting Company, Detroit, Mich. Pamphlet. Shows the various styles of M. C. B. knuckles and locking parts which this company is prepared to furnish. In addition to illustrating the various styles of couplers there is a list of other obsolete couplers for which this company is also prepared to furnish knuckles and locking parts. A list of car and locomotive parts made completes the pamphlet.

Cranes.—The Whiting Foundry Equipment Company, Harvey, Ill. Catalogue No. 82. Covers the complete line of standard Whiting cranes and presents a few views of typical installations. The various cranes include electric travelers, locomotive and coach hoists, gantry traveling cranes, transfer cranes, cranes with clamshell buckets, handpower travelers, locomotive and truck cranes, mono-rail trolleys and jib cranes. The catalogue is divided into sections each of which is devoted to one of the classes of cranes and in each the various types are shown. The illustrations showing typical installations cover practically all styles, and a partial list of users completes the catalogue.

Boiler Tube Cleaners.—The Lagonda Mfg. Company, Springfield, Ohio. Catalogue L. Size 4⅞ x 6¾ in.; pages 48. Discusses the relative advantages and different conditions under which the use of various types of boiler cleaners is most suitable. The line includes water driven cleaners, air and steam driven cleaners and a mechanical cleaner for operation by air and steam motors and belting. An illustrated description of the Weinland boiler tube cleaner of this company appeared in *The Iron Age* March 17, 1910. In addition to the boiler tube cleaners space is given to brief descriptions of boiler room devices, which include the Lagonda water strainer, an illustrated description of which appeared in *The Iron Age* October 6, 1910; an automatic feeding device for removing scale from Stirling boilers without entering the drum, a double action cut-off valve and a number of other devices such as tube cutters, reseating machines, &c.

Pressure and Vacuum Recorders and Indicators.—Precision Instrument Company, 49 Larned street, W., Detroit, Mich. Catalogue E. This is the company's 1911 catalogue, describing and illustrating the Precision line of pressure and vacuum recorders and indicators, which this company manufactures under the Simmance-Abady and other patents. The recorders include one with an armored case for use in exposed situations, the dial type for both portable and stationary use, and one in which the record is made upon a continuous tape. The indicators are of the dead beat type for both portable and stationary use. In addition space is also given to detachable straight and U tube gauges, which are installed both singly and in batteries.

Electrical Machinery and Appliances.—General Electric Company, Schenectady, N. Y. Five bulletins. No. 4685, superseding No. 4394 C, illustrates and describes a line of revolving field belt driven alternators ranging in capacity from 30 to 550 kw. No. 4793, superseding No. 4619, illustrates and describes regulators for controlling generator and feeder voltages. Installations of both types of regulators are shown and there are a number of reproductions of charts showing the voltage with and without regulators. No. 4804, superseding No. 4617, is concerned with a line of direct connected generating sets which, while originally designed to meet the severe conditions of marine work, are also well adapted for both light and power work in isolated plants and as exciters for alternating current generators in central stations. No. 4807, superseding No. 4711, describes two types of small switchboard panels designed for use in small isolated plants containing only one alternator. The publication also contains dimension and connection diagrams. No. 4810, superseding No. 4490 A, gives a detailed description of a line of motor driven air compressors having piston displacements of from 15 to 100 cu. ft. per min. These compressors are mounted on three-wheel trucks and were designed for use where it was not feasible to install a piping system.

Air Compressors.—Allis-Chalmers Company, Milwaukee, Wis. Pamphlet No. 4025. Deals with the use of compressed air for industrial purposes and shows a number of applications. Space is given to a description of the construction of the Allis-Chalmers small motor driven compressors and their special features.

Steel Belt Lacing.—The Bristol Company, Waterbury, Conn. Bulletin No. 152. Describes and illustrates various styles of steel belt lacing and shows four different kinds both ready to be applied and applied to actual sections of belts.

Crucible Melting Furnace.—W. S. Rockwell Company, 50 Church street, New York City. Catalogue No. 12. Illustrates the Rockwell stationary crucible melting furnace for aluminum, brass, copper and various other metals which employs either oil or gas as fuel. The special advantage claimed for this furnace is the production of pure, clean metal with a slight shrinkage loss at a very low cost. The construction of the furnace is briefly described and a short table of specifications for the three sizes of furnace built completes the catalogue.

Floating Reamer Holder.—Colburn Machine Tool Company, Franklin, Pa. Bulletin No. 44. Describes a floating reamer holder for holding any make or style of Morse taper shank reamers in all vertical boring and drilling machines. The special advantage claimed for this holder is that the axis of the reamer is maintained parallel with the center of the hole at all times, while at the same time there is a slight self-adjusting tendency in a radial direction. Two sizes of holder are made, one for holding reamers up to 3 in. in diameter while the other has a maximum capacity of 4 in. The details of the holder as well as its application are illustrated.

Roving Machinery.—Woonsocket Machine & Press Company, Woonsocket, R. I. Catalogue. Illustrations and descriptive matter explain the operation of an extensive line of roving machinery for use in cotton mills. The special features of the different machines are described, and there are a number of tables showing the floor space required for various numbers of spindles and the production per 10-hour day. An illustrated list of repair parts is included, and a number of tables of useful information complete the catalogue.

Corliss Engines.—Allis-Chalmers Company, Milwaukee, Wis. Bulletin No. 1510. Deals with the Reynolds heavy duty pattern direct connected Corliss engine. The special features of these engines are described and the illustrations show several installations.

Steam Traps.—William S. Haines Company, Twelfth and Buttonwood streets, Philadelphia, Pa. Pamphlet. Refers to the Heintz apparatus for preventing the escape of steam with the water of condensation. The construction of the device is described and the manner of installing it shown.

Automobile Axles.—Collins Axle Mfg. Company, 319 Frick Building, Pittsburgh, Pa. Pamphlet. Points out the advantages of using the Collins rear axle for furnishing a direct drive to the driving wheels of automobiles at all speeds. The construction of the axle is described at length, and a report of tests showing the amount of power transmitted by the Collins drive, as compared with the ordinary three-speed sliding gear transmission, is included.

Traction Engines.—Woods Brothers Steel Self-Feeder Company, Des Moines, Iowa. Catalogue. Illustrates and describes a line of single and double geared internal combustion traction engines. A special feature of the double geared engine is the use of a center crank and two gear trains, one on each side.

The Machinery Markets

It appears that the machinery demand is better in New York than in other parts of the country, although reports from all sources are encouraging. A good amount of actual buying is being done in and around New York, while elsewhere inquiries rather than orders predominate. New England is an exception to this, as the improvement there is becoming general, and inquiries in sight indicate a further increased business. The outlook for business from the railroads is good everywhere. In Chicago most of the orders recorded of late have been for single machines, but if the inquiries there develop into orders the market will shortly be very satisfactory. A similar condition exists in Cleveland, where actual sales are not good, but inquiries are large. Trade is irregular in Philadelphia, and again there purchases are less pronounced, while the inquiries are large. A decided improvement is noted in Cincinnati, but conditions are not up to normal and export orders are occupying most of the addition.

New York

NEW YORK, February 21, 1911.

All signs point to continued improvement in the machinery trade. Inquiries and orders are steadily increasing. It is also noticeable that inquiries are of a better nature than usual; in other words, most of those inquiring mean to buy as soon as possible and a better percentage of the inquiries results in actual business than was the case a few months ago. The machine tool demand is particularly good, and at least two fair-sized lists of requirements are now before the trade. The New York, Ontario & Western Railroad has not as yet placed orders against the large list sent out two weeks ago, but it is learned that the tools are wanted for the Middletown shops. A contract for these shops has just been let, and it calls for an expenditure of $350,000. It is thought that a supplementary list of tools will be issued before the shop is fully equipped. The Baltimore & Ohio Railroad is making inquiries which indicate that it will soon come into the market. This company will shortly build large shops at Newark, Ohio, and it is reported to be preparing plans for extensive shops at Cumberland, Md. At present there are no new railroad lists out. Manufacturers of contracting equipment are handling a larger volume of inquiries than they have in a number of months. It is expected that in the spring a great deal of dock building, dredging and highway construction work will come forward, according to construction contractors in that line of work, and many of them are preparing to buy new equipment. Foundries making machinery castings are doing a good business, and from the inquiries they have it is judged that many manufacturers of machinery have disposed of their surplus stock and are now making equipment to order, as many of them are ordering castings with a view to supplying the future demand.

The M. H. Treadwell Company, 140 Cedar street, New York, is buying against a large list of machine tool equipment. The company originally inquired for slightly used machines, but now intends to purchase new tools. A partial list of its requirements follows:

One traverse double head shaper, 26-in. stroke, 16-ft. bed.
One milling machine, horizontal spindle only, table 24 in. by 8 ft.
One wheel press, clearance 6 ft., 300-ton, for car wheels.
One set 8-ft. bending rolls for ½-in. plates.
One combined punch and shear, 24-in. throat.
One punch, 24-in. throat, for ½-in. plates.
One 18-in. wood disk grinder.
One patternmakers' lathe, 90-in. face plate.
One patternmakers' lathe, 20-in. by 10-ft.
One patternmakers' wood trimmer, 8 x 24 in.
One 800-lb. steam hammer.
One 4000-lb. steam hammer.
One 36-in. by 12-ft. planer, two heads.
One 36-in. by 28-ft. lathe.
One 16-in. by 8-ft. lathe.
Two 18-in. by 12-ft. lathes.
One 48-in. by 30-ft. lathe.
One 30-ton arbor press.
One 2-in. bolt cutter.
One double head 76-in. or 80-in. driving lathe.
One 14-ft. boring mill.
One 10-ft. boring mill.
One bulldozer.
One 16 x 6 in. by 20 ft. open side planer.

The list also includes drilling machines, drill grinders, a wet tool grinder, keyseater, &c.

The municipality of Spring Lake, N. J., has issued a list of water works equipment on which bids will be received by E. V. Patterson, Borough Clerk, on March 10. Bidders are asked to include the complete mechanical equipment in their propositions, which will include two triplex expansion direct acting pumping engines, one duplex cross compound steam, two-stage air compressor, one surface condenser, with combined air and circulating pump, one boiler feed pump, two feed water heaters, three return tubular boilers and stack breeching. Joseph L. Sweigard, Betz Building, Philadelphia, is the engineer.

The International Flexible Rubber Hose Company, which has been incorporated with an authorized capital of $125,000, with offices at 9 Mulberry street, Newark, N. J., is beginning the manufacture of metallic hose at that address. Louis V. Aronson, president of the Ronsen Wrench Company, is the principal incorporator, and associated with him is Alexander Harris and Frederick Wilkie. The company is having special machines built for the manufacture of flexible metallic tubing, which can be utilized for electric conduit work, steam conveying, acids, &c. The tubing is made by a new process and is air tight and can be made of any flexible metal.

The Public Service Corporation of New Jersey, whose main offices are at Newark, has awarded a contract to E. M. Waldron & Co., of Newark, for construction work on a power house to be erected at Perth Amboy, N. J., on which Payne Brothers, also of Newark, will do the structural iron work. The building will be 200 ft. sq. and 50 ft. high, and the power plant will have a capacity of 400 kw. Westinghouse generators and Alberger condensers will be installed. The building will be so arranged that later on power equipment to develop 200 kw. additional can be installed.

The Leonard Sheet Metal Works, 219 Grand street, Hoboken, N. J., has purchased a site on New York avenue, 209 x 260 ft., adjoining the Fessenden Cooperage Works, on which it will erect a building, 60 x 250 ft., two stories. Wood and metal working machinery for the manufacture of fire doors, skylights and cornices will be installed. L. Meystre & Sons are the architects.

The Calmon Asbestos & Rubber Works, corner of Cliff and John streets, New York, which suffered a loss by fire February 16, has taken temporary offices at 11 Cliff street, where it is ready to take care of its customers.

The Hayes Track Appliance Company, Geneva, N. Y., is arranging to move its plant to Richmond, Ind. The company will not require a great deal of additional machinery.

The Steel Ball Company of America, 350 Broadway, New York, has been incorporated with $100,000 capital stock to manufacture steel balls for bearings under a patent process. The company will establish a plant as soon as a suitable site can be secured. The incorporators are R. A. Martin, E. N. Lowy, A. E. Dadula, all of New York.

The Federal Milling Company, Lockport, N. Y., which has arranged to move its plant to North Tonawanda, will commence erection early in the spring of a flour mill and grain elevator on the Niagara River and New York Central Railroad industrial tracks in the latter city.

The National Coal Oil Company, Buffalo, N. Y., is completing its three-story factory at Alabama street and the Erie Railroad, that city, and equipping it with requisite machinery piping and reservoirs. C. H. Cotton, formerly of Corning, N. Y., is secretary-treasurer and manager.

The Delaware & Hudson Railroad Company contemplates the erection of a new round house, ashpits and coalpockets at Binghamton, N. Y., which will cost about $100,000. George H. Burgess is chief engineer, Albany, N. Y.

The Stone Smelting & Refining Company has been incorporated at Niagara Falls, N. Y., with a capital stock of $50,000, and will engage in smelting of minerals and in mining and dealing in minerals and lands. The incorporators are A. W. Britton, G. E. Holmes and J. S. Stubbs, all of New York City.

The Myers Plane Company, Buffalo, N. Y., has been incorporated to manufacture motors and motor-driven vehicles, boats and aeroplanes. Its specialty is to be the manufacture of the George F. Myers patent self-righting aeroplane. Bronson Rumsey is president; H. Montgomery Gerrans, vice-president; Walter F. Semon, president of the Frontier Iron Works, secretary and treasurer; offices, 674 Ellicott Square.

THE MACHINERY MARKETS

The factory buildings, machinery and equipment of the Herring-Curtiss Company at Hammondsport, N. Y., have been purchased from the trustee in bankruptcy by Glen H. Curtiss, the aviator and founder of the concern, who will reorganize the company, retaining control, and continue upon an enlarged scale the manufacture of aeroplanes, motors and motorcycles.

The Denniston Company, Buffalo, N. Y., has been incorporated with a capital stock of $150,000, to manufacture motor trucks and vehicles of all kinds, motors, engines, machinery, &c. A manufacturing plant has been arranged for and requisite machinery equipment will soon be ordered. The incorporators are E. E. Denniston, E. C. Anderson and F. U. Brown, Buffalo. E. E. Denniston, 184 West Huron street, will be the president.

The village of New Hartford, N. Y., near Utica, has voted in favor of constructing a sewage system and sewage disposal plant from plans of A. M. Scripture, engineer. M. Baker is president of the Village Board.

Philadelphia

PHILADELPHIA, PA., February 20, 1911.

Business has shown a further tendency toward irregularity. Actual purchases are reported, both by merchants and tool builders, to have been less pronounced, notwithstanding the fact that inquiries have for some weeks shown a slight betterment. Prospective buyers still show hesitancy when it comes to placing orders, as they apparently prefer to wait for an actual improvement in conditions rather than anticipate the same. Several fair sized projects which have been under negotiation for some time appear to be getting nearer closing; in fact, against one of these, the requirements of the Treadwell Engineering Company and its associate concerns, for their new plant at Easton, Pa., some little business has already been placed. The railroad demand in this territory has again quieted down and very few inquiries of moment are in immediate sight. The belief that business will improve before a very great while is to be generally noted, and the betterment in the iron and steel trades, with finishing mills at materially increased capacities, is considered a most favorable factor in the future buying of machinery and tools. There is a fair demand for boilers and engines, but no business of importance has been closed. Second-hand machinery has not been in particularly active demand, although in a few instances stocks on sellers' hands are being carefully gone over for desirable equipment. Both iron and steel casting plants report a slight betterment in general trade conditions.

The Pennsylvania Railroad sent out an inquiry last week for a 2-in. pipe threading machine.

Koelle, Speath & Co., engineers, are reported to be preparing plans for a two-story ice manufacturing plant, 40 x 80 ft., which is to be erected and equipped for the Commonwealth Brewing Company at 2736 Cambridge street.

Joseph F. Hasskarl, acting director, Department of Wharves, Docks and Ferries, city of Philadelphia, will receive bids until Tuesday, February 28, for the mill and shop inspection and testing of all structural steel required for the superstructure of the Vine street pier, under department contract No. 40 with W. S. P. Shields, Philadelphia. Specifications in connection with the work to be performed may be obtained at the office of the director, 555 Bourse Building, Philadelphia.

The Philadelphia Roll & Machine Company reports a marked improvement in the demand for heavy charcoal iron castings. A few weeks ago the demand was quiet and the plant operating irregularly, but owing to increased orders the foundry department has since been placed on full time. Among recent contracts closed by this concern was one for a complete rolling mill and drive for Shimer, McGlynn & Co., of this city.

Several building and contracting concerns in this city are estimating on a brick, steel and reinforced concrete pattern shop, to cost, it is said about $125,000, for the Vulcan Iron Company, Wilkes-Barre, Pa.

The E. G. Schlichter Company, Norristown, Pa., has under consideration, it is reported, the erection of a one-story brick silo and tank factory, 40 x 200 ft.

Cyrus H. K. Curtis has commissioned the engineering firm of Frank C. Roberts & Co. of this city to design a warehouse and coal storage plant, three stories, of brick and concrete, 114 x 173 ft., to be erected on property acquired about a year ago from Robert M. Cunliffe at the northwest corner of Eleventh street and Washington avenue.

D. T. Homan, representing the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn., in this territory, reports a material improvement in the demand. Inquiries have been more pronounced and the outlook for future business is believed to be much more encouraging. Among recent orders taken by this concern may be mentioned: one 80-in. guide bar grinder, for the Louisville and Nashville Railroad; three No. 5 motor-driven, and three belt-driven wet tool grinders, for the Kansas City and Southern Railway; two 156-in. heavy automatic knife grinding machines, motor-driven, for the American Sheet & Tin Plate Company, for its Gary, Ind., plant; one 90-in. heavy automatic knife grinder, for the Nonotuck Paper Company, Holyoke, Mass.; one No. 3 wet-grinder, for the Bury Compressor Company, Erie, Pa., and two No. "E" floor grinders for the Jewell Steel & Malleable Iron Company, Buffalo, N. Y.

Chicago

CHICAGO, ILL., February 21, 1911.

If something would occur in the near future to convert into orders all the inquiries that are pending in the market, Chicago machinery dealers would have a very satisfactory rush of business. Most of these inquiries, however, have been lying dormant for weeks or even months. It is evident that in most cases buyers have been figuring on what they really will need in the near future, but as a rule they will not actually close until there is a definite turn in the business situation, or until their own shop necessities force them to purchase. There is, however, a little improvement right along in the amount of business being done, and at an average, Chicago houses are doing 50 to 75 per cent. of their normal volume of sales. If the improvement of the past month continues steadily the business may reach as good a volume as the dealers had in the first half of last year. The business done is principally in orders for single machines. There is a little scattering railroad business going, but the dealers are still wondering when the Western railroads will begin the work of bringing their shops up to date.

The Comptograph Company, Chicago, has plans prepared for a five-story factory building, 50 x 120 ft., which it will erect at 853 to 863 North Marshfield avenue.

The Northwestern Can Company, Chicago, has closed a deal with the Factory Promoting Club, Brazil, Ind., for the removal of its factory to that city.

The American Insulated Wire & Cable Company, Chicago, has increased its capital stock from $100,000 to $200,000, having recently made extensive improvements to its plant.

The Chicago Retort & Fire Brick Company, Chicago, has increased its capital stock from $120,000 to $250,000 and is making extensive improvements to its plant at Ottawa, Ill. The company is erecting a new building, increasing its dryers and building new kilns.

The Consolidated Concrete Tie Company, Cairo, Ill., has been incorporated with $100,000 capital stock, to manufacture concrete ties under the Snedd and Cowan patents. The company has a plant in operation at the present time at Pulaski, Ill., and is having plans prepared for another to be erected at Cairo. All parts necessary to the manufacture of the ties, including the wood and paper cushions, iron reinforcing rods, rail fastenings, &c., will be made by the company. The company has a test set of ties in the tracks of the Illinois Central at Dongola, which have stood very severe tests, and is manufacturing ties for the Mobile & Ohio to be placed at Murphysboro, Ill., and for the Atchison, Topeka & Santa Fe, to be placed at Los Angeles, Cal.

The Bridgeport Light & Power Company, Bridgeport, Ill., has been incorporated, with a capital stock of $25,000. The incorporators are R. D. Donnelly, W. E. Beyhan and V. H. Lytle.

The Compound Wood Company, Batavia, Ill., has been incorporated, with a capital stock of $40,000. The incorporators are John R. Newhall, John M. Raymond and Albert J. Kelley. The company will conduct a general manufacturing business.

The Utica Fire Sand Company, Utica, Ill., has been incorporated, with a capital stock of $30,000. The incorporators are J. J. Neary, John M. Quinlan and W. B. Cunningham. The company will engage in quarrying and manufacturing silica, sand, &c.

Cleveland

CLEVELAND, OHIO, February 21, 1911.

Local machine tool dealers report a good volume of single tool inquiries, mostly for small sizes. Business, however, is slow in coming out, and in actual orders booked during the week the record of one or two weeks earlier in the month, when some fairly good orders were placed, was not

THE MACHINERY MARKETS

kept up. Taken altogether, there is a fair volume of business pending and dealers look for a more active market early in March. While general business is better, it has not improved sufficiently to encourage manufacturers to add new equipment for plant extensions and consequently little business in round lot orders is in prospect at present. The demand for second-hand machinery shows a little improvement. The railroads are still holding off, business from that source being limited to an occasional single tool order. The demand for electrical equipment is light. In the foundry trade some improvement in orders is noticed.

Employers' liability insurance will be one of the important topics to be discussed at the annual meeting of the National Metal Trades Association to be held at the Hotel Astor, New York, April 12 and 13. At a meeting of the Executive Committee of the association held in Cleveland, Ohio, February 15, it was decided that as this was one of the most vital subjects of the day, the entire forenoon of the second day of the meeting should be devoted to its consideration.

The Cleveland Construction Company, 600 Citizens Building, Cleveland, is preparing plans for the new power house to be built by the Northern Ohio Traction & Light Company, at Cuyahoga Falls. Specifications for the equipment are expected to be out about April 1. In addition to building a large plant to supply power for all of its interurban lines the traction company will add to its equipment at its local power house in Akron, for which it has placed an order with the General Electric Company for a 1000-kw. motor-generator set, switchboard and exciter. The order also included motor equipment for eight interurban cars.

The Brightman Mfg. Company will remove from Shelby to Columbus, Ohio, its plant in the former city having been burned in December. A 17-acre site has been purchased, on which a large plant will be built. L. H. Brightman of Cleveland is president of the company. It manufactures steel shafting and other products.

The Universal Machine Tool Company is the name of a new concern that will establish a plant in Canton, Ohio. Orders for its machinery equipment have been placed.

The Superior Iron & Mfg. Company, Toledo, Ohio, has asked for authority to increase its capital stock from $50,000 to $100,000. The company makes gray and malleable iron castings, having a plant at Wauseon, Ohio. The proposed increase is to provide more working capital.

The Bremen Mfg. Company, recently organized at Bremen, Ohio, will manufacture engines to be used in the oil and gas fields.

The Cleveland Smelting Company, Cleveland, has been incorporated with a capital stock of $25,000, to smelt, refine and deal in ores and metals. The incorporators are W. A. Bickford, C. H. Bickford, C. V. Burke, J. A. Burke and W. A. Byrnes.

Julius Weber of Mansfield, Ohio, is contemplating the erection of an ice manufacturing plant at Ashland, Ohio.

The Toledo Screen Company, Toledo, Ohio, has added 85,000 sq. ft. of floor space to its plant by the purchase of the works of the Maclaren & Sprague Company, adjoining. The acquired property is completely equipped with modern machinery which will enable the screen company to immediately double its output. The company will add 150 men to its force, making it one of the largest plants in the country engaged in the production of screens.

It is reported that an agreement has been reached between the Empire Portland Cement Company, Portsmouth, Ohio, and the Menominee Commercial Club, Menominee, Mich., whereby the former will erect a factory on a site to be donated by the city. About $500,000 will be expended in the construction of the plant, work upon which will be commenced by June 1.

Cincinnati

CINCINNATI, OHIO, February 21, 1911.

With the machine tool builders, February, thus far, is a decided improvement over the corresponding period of the previous month. Some scattered export orders are reported during the past week, and there is also an increase in business booked from the general trade. Conditions, however, are not up to normal, and it may take some heavy buying, either from the railroads or auto truck builders, to bring them up to that standard.

There is a light but steady improvement in the second-hand machinery business. While foundrymen see better times ahead, some of them are not now running over 50 per cent. of capacity.

Attention is called to the large number of new companies recently formed in the central West for the manufacture of household and farm specialties, such as washing machines, &c. The total amount expended for small tools and woodworking machinery to equip these plants is surprisingly large.

The Rahn-Larmon Company, Cincinnati, is making shipment of two of its larger sized gap lathes to Rotterdam, Holland.

Thompson Brothers, with offices now located in the Second National Bank Building, Cincinnati, have leased part of the plant being vacated by the Queen City Punch & Shear Company, and will fit it up with special machinery for the manufacture of its patented washing machines.

Davis & Siehl, Cincinnati, makers of fencing and other iron and steel specialties, have incorporated under the name of the Davis & Siehl Company, with $30,000 capital stock. The incorporators are J. Frank Davis, C. Fred Siehl, Carl W. Siehl, John D. Berger and Gottfreid H. Voicks.

The Buckeye Jack Mfg. Company, Alliance, Ohio, has increased its capital stock from $30,000 to $50,000, and it is reported that some additions to its manufacturing facilities are contemplated.

The Doermann-Roehrer Company is a new Cincinnati incorporation, to handle mill, mine and factory supplies. The capital stock is $10,000 and the incorporators are Charles H. Doermann, Michael Roehrer, O. W. Bennett, John E. Wright and Dora Rehback. The business location has not yet been announced.

The Cincinnati Car Company has increased its capital stock from $100,000 to $1,500,000, and it is rumored that work will commence at an early date, on the large extensions to its shops, Winton place, recently mentioned.

The Eddy Auto Company, Cincinnati, is having constructed a large two-story garage, in connection with which there will be a small repair shop.

The Metal Specialty Company, Cincinnati, maker of advertising signs and novelties, whose plant was recently burned, has leased a building at Sixth and Burns streets, which is being fitted up for the manufacture of its specialties.

The recently completed machine tool plants at Oakley, Cincinnati suburb, are attracting a great deal of outside attention. Among visitors lately who have come here to investigate the construction and arrangement of these buildings is Paul B. Kendig, president of the Seneca Falls Mfg. Company, Seneca Falls, N. Y. The Continuation School also receives a great deal of favorable comment from visitors.

New England

BOSTON, MASS., February 21, 1911.

The demand for machine tools and kindred lines and the promise of business based on active inquiries continue along the same substantial line which has characterized the past few weeks. The improvement is not uniform, but is becoming more general. Miscellaneous manufacturing lines are more active; with some of them business is as good as could be desired. But the situation as it applies to various industries and units of individual industries cannot yet be called consistent. Announcements of manufacturing plants are constantly being made, promising large buying of equipment in the spring and summer. It is a noteworthy fact that general building of all kinds, including large business blocks and hotel property, promises to be excellent. The savings banks report an unusual number of real estate mortgages having to do with new construction and improvements.

Landers, Frary & Clark, New Britain, Conn., manufacturers of hardware specialties, have awarded the contract for a factory building, 50 x 350 ft., and seven stories. The company states that plans for the use of this building as to the various departments of the business have not been completed.

The Dosch Mfg. Company, 823 Railroad avenue, Bridgeport, Conn., manufacturer of special machinery, will erect a factory on Third street, 60 x 140 ft., one story, of reinforced concrete. The company states that it will probably require no new machinery for some time.

The Meriden Board of Trade Realty Corporation has been organized at Meriden, Conn., with the intention of erecting an industrial building for rental to small manufacturing concerns, several of which already stand ready to take space.

The L. W. Pond Machine & Foundry Company, Worcester, Mass., manufacturer of gray iron castings, will replace its foundry by an entirely new plant, which will have a largely increased capacity and will be one of the most com-

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plete in New England in its design and equipment. The building will occupy the site of the present structure and will be erected around and over it, with no interference with the present productive operations until the new equipment, including cupolas, is in readiness. The foundry will be of brick and steel construction, about 100 x 245 ft., one story, and will have a maximum of window area. Three 5-ton electric traveling cranes will be installed. Two new cupolas will be erected, with a capacity of 15 tons an hour, giving a daily output of from 30 to 50 tons of iron. A new blower will be put in, and there will be two new core ovens and two dry sand ovens. In fact the equipment throughout will be new. The company has purchased some molding machines and others will be added. The contract for the cranes has been placed, but no other purchases have been made. The cupolas cannot be built until work on the raising of the tracks of the New York, New Haven & Hartford and Boston & Albany railroads, at the rear of the property, has further advanced, that is to say, about the middle of the year. It is not the intention to go into heavier castings, but to increase the output along present lines of production. The estimated cost of the building is $75,000; the plans are now being figured by the contractors. M. Thomas O'Leary, Worcester, is the president, treasurer and manager of the company, the other directors being Henry Prentiss and G. L. Wilson, New York, and William F. McCarthy, Boston.

The Guyler Engineering Company, Boston, has awarded the contract for the new works at South Framingham, Mass., which will be occupied by Marcus Mason & Co., Worcester, Mass., manufacturer of coffee and sugar machinery.

A large amount of machinery was destroyed by a fire in the box factory of J. L. Brackett & Son, Portland, Maine, February 18.

The Penfield Shock Absorber Company, Meriden, Conn., has established a factory for the manufacture of shock absorbers. William A. Penfield is president and treasurer, and Charles L. Penfield, secretary.

The Stanley Works, New Britain, Conn., has increased its capital stock from $1,500,000 to $2,000,000, the stock being distributed at par to present stockholders in proportion to their holdings. The new capital is made necessary by the large expansion of the company's business, which is due particularly to the establishment of a large branch plant at Niles, Ohio.

The stockholders of the American Screw Company, Providence, R. I., have authorized the reduction of the capital stock of the corporation from $3,250,000 to $3,000,000 through the retirement of 2500 shares purchased by the company of a local banking institution.

The Woonsocket Machine & Press Company, Woonsocket, R. I., manufacturer of textile machinery, will erect large additions to its shops, consisting of a four-story building, 83 x 100 ft., and a one-story building, 105 x 125 ft. The work of construction will begin immediately. The company proposes to add new lines and must have the additional shop space.

The plans of the Baird Machine Company, Oakville, Conn., for its new plant at Bridgeport, Conn., call for about 100,000 sq. ft. of floor space. The particular design and style of buildings, as submitted by the engineers in charge, have not been finally approved.

Schwartz Brothers, Bridgeport, Conn., will erect a new woodworking plant at the corner of River and Winton streets, which will replace the structure partially destroyed by fire a few weeks ago. The building will be 61 x 100 ft., two stories, of concrete blocks.

The Eagle Knife & Bar Company, Lawrence, Mass., manufacturer of machine knives and bars, states that it will build no addition to its works at the present time, the recent purchase of a tract of land adjacent to its property being intended for future expansion.

The Climax Specialty Company, Norwich, Conn., has been organized under Connecticut laws, to manufacture metal specialties and novelties. James C. MacPherson is the president and Tyler Crittenden the secretary and treasurer. The company states that its factory will probably be located in Norwich.

The Willimantic Industrial Company, Willimantic, Conn., is about to place the contract for a new mill building 200 ft. long, with saw-tooth roof, and for a boiler house.

Plans are making for a new hotel building at Hartford, Conn., to be erected by a new company, headed by G. F. Heublein. It will replace the present Heublein Hotel, and will be 110 x 125 ft., and 14 stories.

The Burns & Bassick Company, Bridgeport, Conn., which operates a large plant for the manufacture of furniture trimmings, is making a specialty of producing in large quantities small castings, metal stamping and screw machine products, according to the specifications of customers.

St. Louis

ST. LOUIS, February 20, 1911.

The Beck & Corbitt Iron Company, St. Louis, Mo., will erect an addition to its present plant, which will then cover an entire block. The improvements, when completed, will cost about $80,000, and will give the company a seven-story building, each floor having an area of 222 x 226 ft. Details regarding equipment to be installed have not been decided upon.

A cut glass factory, in which Eastern parties are interested, which will represent an investment of $50,000, will soon be established at St. Louis. Leases for the property to be occupied have been drawn and will be signed in a few days, at which time the names will be divulged. It is known, however, that the factory will be located in the northwestern part of the city. It is reported that the concern is Joseph D. Bergen & Co., Meriden, Conn.

The National Ice Cream Company, St. Louis, will locate at 4719 Delmar avenue. This is a new corporation with a capital stock of $10,000. A. Moll is the head of the new company.

The Owens Paper Box Company, St. Louis, has been incorporated with a capital stock of $20,000. The incorporators are Jackson J. Owens, Joseph P. Connor, Louis Spelbrink and others.

The Martels Water Heater Company, St. Louis, has been incorporated with a capital stock of $10,000. The incorporators are Charles Von Martels, H. W. Martels and J. E. Diamond.

The citizens of Moberly, Mo., owing to the present small supply of natural gas, are seeking to have a gas plant established in that city.

The Sheffield Ice Company, Kansas City, Mo., has been incorporated, with a capital stock of $20,000. The incorporators are D. D. Dutton, Sloan Tugeon and Hugh E. Martin.

The United States Steel Doubletree Company, Rolla, Mo., has been incorporated, with a capital stock of $20,000. The incorporators are William E. Harmon, J. A. Jones and F. A. Webb.

The Savannah Stone Company, Savannah, Mo., has been incorporated, with a capital stock of $20,000. The incorporators are O. F. Spiers, H. J. Wisehart and J. H. Vanbrunt.

The Commercial League of Fort Smith, Ark., has closed a contract for the removal to that city from Buchanan, Mich., of the Three B Feather Duster Company. The concern will occupy a building giving it manufacturing and storage space of 10,000 sq. ft.

A company of New York capitalists is reported to be seeking to purchase the city water works at Eureka Springs, Ark., and the City Council has applied to the Legislature for permission to hold an election for a vote on the proposition.

A company, to be known as the Little Rock Hydraulic Brick Company, is being organized at Little Rock, Ark., for the purpose of engaging in the manufacture of brick.

Indianapolis

INDIANAPOLIS, IND., February 21, 1911.

The Auto Specialty Mfg. Company has been organized at Indianapolis with $10,000 capital stock to manufacture auto parts. The directors are A. T. Pursell, M. V. Wiggins, G. W. Dollarhide, F. E. Floyd and J. L. Floyd.

The Hoosier Filling & Sealing Machine Company, Indianapolis, has been organized with $10,000 capital stock, to manufacture filling and sealing machines. The directors are Thomas Moss, Norman Moss and A. O. Todd.

John J. Appel, Indianapolis, will be the president of a new company formed to take over the De Tambles Motors Company of Anderson, Ind. The new company is composed largely of agents for the old concern who have contracted for this year's output of motor cars and who have advanced about $40,000 on their contracts. They agree to put $50,000 cash into the business if a compromise offer submitted to the creditors is accepted. The Anderson Trust Company, appointed receiver for the plant a few days ago, has been discharged.

The Marvel Carbureter Company, Indianapolis, has increased its capital stock from $15,000 to $50,000. B. N. Pierce is president of the company.

The Van Camp Cash Register Company, Brookston, Ind., has been dissolved.

The Manufacturers Plant & Power Company, South Bend, Ind., has increased its capital stock from $100,000 to $150,000. George Knapp is president of the company.

The S. B. Helm Mfg. Company, Crawsfordville, Ind., has

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been incorporated, with $15,000 capital stock, to manufacture metal tanks. The directors are W. H. O'Neal, Charles E. Lacey and Alice S. Lacey.

The Warsaw Chamber of Commerce has been organized at Warsaw, Ind., and at the first meeting an industrial fund of $17,000 was subscribed. The officers are: President, W. D. Frazer; vice-president; L. W. Royse; secretary, C. H. Ker; treasurer, D. H. Lessig.

The Knott-Van Arman Mfg. Company, Fort Wayne, Ind., has changed its name to Van Arman Mfg. Company.

E. A. Hayman has been appointed receiver of the O-U Handy Tool Company of North Vernon, Ind. The company was organized a few months ago, to manufacture auto jacks and a combination tool for farmers. The people of Mt. Vernon subscribed $7000 in stock, a site was chosen for a factory and part of the machinery purchased, but financial difficulties interfered with further progress and the directors asked for a receiver.

A. L. Bodie of Milwaukee, Wis., is in Danville, Ind., trying to revive the Cowie Window Sash Company, which was organized there about a year ago to manufacture an adjustable and removable window sash. Buildings were erected by Danville people, but the Indianapolis promoters did not purchase the machinery and the company has been in receiver's hands. Mr. Bodie is organizing a new company composed of local people exclusively.

The George W. Davis Carriage Company, Richmond, Ind., has increased its capital stock from $30,000 to $60,000. George W. Davis is president of the company. The Elkhart Brass Mfg. Company, Elkhart, Ind., has increased its capital stock from $25,000 to $60,000. A. E. Hanauer is president of the company.

George A. Briggs of Elkhart, Ind., is at the head of the Briggs Mfg. Company, which has been incorporated under the laws of Maine with a capital stock of $200,000. The company will manufacture electrical apparatus and supplies.

The Kelly Foundry Company, Elkhart, Ind., will erect a foundry building 60 x 200 ft., machine shop 60 x 100 ft., and a pattern shop in connection. The company will manufacture cast iron blow-off basins, exhaust heads and a general foundry line.

The William Garver Tank Works, East Chicago, Ind., has purchased from the German American Car Company a building which was on its property and has improvements under way.

The Brooklyn Tool Company, Brooklyn, Ind., incorporated with $10,000 capital stock, has contracted with the Bales Forge Company, Indianapolis, for the manufacture of its product for the present.

Formal transfer of the plant of the New Albany Woolen Mills, New Albany, Ind., to the American Automobile Mfg. Company, has been made and the latter company is proceeding with the installation of machinery for the manufacture of motor cars.

The Southwest

Kansas City, Kan., has voted bonds in the sum of $350,000 for a municipal lighting plant. J. A. Cable is commissioner of lights.

Bonds in the sum of $25,000 have been voted by Dodge City, Kan., for the construction of electric light plant and sewers.

The City Council of Luray, Kan., is considering the establishment of a water works system.

The Board of Public Works, Hannibal, Mo., has purchased a cross compound condensing engine and a 600-kw. generator, for enlargement of the electric light plant and will purchase a water tube boiler of approximately 400 hp.

Lanpher Brothers, Carthage, Mo., have purchased the business of the Mallory Carriage Works. It is the intention of the firm to incorporate their business the coming spring and erect a two-story factory and repair building which will be equipped for the manufacturing and repairing of automobiles and other vehicles.

The Osage Handle Company, Eldon, Mo., whose plant was destroyed by fire January 21, with a loss of $75,000, has plans for rebuilding its plant on a much larger and better scale, equipped with modern machinery, details for which are not yet available.

Farmington, N. M., will expend $50,000 for improvements to its water works system.

The Oklahoma Iron Works, Tulsa, Okla., is considering extensive improvements to its plant, but advises that nothing definite has been decided upon.

A corporation has been organized at Ogden City, Utah, which has been granted a 35-year franchise for the installation of an electric light plant. While the organization has not yet been completed it is proposed that M. S. Browning of that city will be elected president.

The city of Snyder, Ark., has voted for the issuance of $4000 in bonds for the extension of its water works and electric light system.

The Chickasaw Cotton Oil Company, Chickasaw, Okla., will purchase second-hand machinery for an electric light plant. R. G. Latting is superintendent of the company.

Toronto

TORONTO, February 18, 1911.

As the spring approaches and the trade conditions for that season and the summer become less uncertain, preparations are being entered upon for the carrying out of projected undertakings and the starting of new industrial work. Makers and sellers of plant and equipment are receiving orders and inquiries on account of such proposed ventures. The railroads are being heard from by the manufacturers of cars and locomotives. Several new lines are to be built in Ontario. Machinery is still going into the mining districts, Porcupine Camp particularly, of northern Ontario. Building operations, which have slackened somewhat on account of unfavorable weather, are to be carried on upon a very large scale throughout the country when spring opens up. As a body the architects of Canada are very busy upon plans for new buildings, many of which are steel structures of large dimensions. There was a considerable interruption of operations at many of the Hamilton factories this week, owing to ice obstructions and the action of heavy east winds upon the power plant of the Cataract Company. Toronto's factories were also somewhat affected by the gale, causing a 12-hour stoppage of the city's water supply.

The Lumby-Stenhouse Foundry Company started up its new plant at Fort William, Ont., this week.

The ratepayers of Windsor, Ont., have approved the by-laws to grant bonuses to a Canadian branch of the Maloney Electric Company of St. Louis, to be established in the town, and to the Canadian Winkley Company, an offshoot of a Detroit concern. The former company will manufacture electrical machines at Windsor, and the latter will make brass goods.

The Canadian Manufacturers' Association has received a letter from the treasurer of an industrial city in Ontario, the name of which is not given, to the effect that the Municipal Council there has decided to discontinue its campaign for new industries because of the reciprocity agreement.

The contract for equipping the ditches, &c., of the new Grand Trunk Hotel at Ottawa has been awarded to the Gurney Mfg. Company, Toronto, the amount being about $100,000.

Expenditures in Toronto aggregating $5,000,000 are promised by the vice-president of the Canadian Pacific Railway Company.

The Sawyer & Massey Company, Hamilton, Ont., which expended $100,000 on capital account during the last year by additions to its molding shop, and the installation of new plant and machinery, proposes to erect warehouses at Regina and Saskatoon in the West. In addition to steam power plants it intends to manufacture gasoline and oil traction engines. Until it has its own works ready for turning out the latter class of articles, it has made arrangements with American and English firms to take care of its orders for gasoline and oil traction engines.

The discovery of oil in the vicinity of Morinville, Alberta, has been followed by the incorporation of scores of companies to sink and operate wells in that district. Several of these are preparing to install plants.

The City Council of Regina, Saskatchewan, has decided to give an order to the Siemens Brothers Dynamo Works, England, for a Bellis-Marcam engine and a dynamo and switchboard, and to buy a C. H. Wheeler condenser from the C. H. Wheeler Company of Philadelphia.

J. D. McArthur, Winnipeg, has secured the contract for the extension of the Algona Central Railway toward Hudson Bay. The cost is about $4,000,000.

The Municipal Council of Calgary, Alberta, is urging the Canadian Pacific Railway Company to choose that city for the new car shops that are to be established by the company in the West.

The Canadian Pacific Railroad Company has promised to spend $250,000 on improvements in London, Ont. This will be upon yards, station house and roundhouse.

In the coming summer all the wooden bridges on the section of the Canadian Pacific Railroad between Toronto and Windsor, in Ontario, are to be replaced by steel structures.

The Canada Ford Company, Montreal, has obtained the contract for the cars of the municipal electric railway system in Regina, Sask. The company is having the cars

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built at the works of the British Company, Loughborough, England. These will be the first English made cars used in the Canadian West. It is thought that the Loughborough company will establish works in Montreal.

The Cowan Construction Company has secured the contract to build 200 miles of line of the Canadian Northern Railway from the Pembina River to Yellowhead Pass, in the Rocky Mountains. The contractors are arranging to get a large number of outfits on the ground in time for an early spring start.

The Canadian General Electric Company proposes to erect in connection with its works at Peterborough, Ont., a large factory in which to make lamps. The estimated cost of the building is $250,000.

Hering, Fuller & Monahan, New York, have obtained the contract to prepare plans for the water filtration plant to be built in Montreal next summer. The firm will receive $31,000 for the planing and supervision of the work.

The Sydney Mines Electric Company, Sydney Mines, N. S., is planning an increase of its plant and the addition of apparatus.

The Sheppard & Marse Company, which has several lumber camps on the Montreal River in northern Ontario, is installing an electric plant near Temagami for operating its mills.

A company has been formed to manufacture heating and ventilating apparatus, plumbers' and steam fitters' supplies, &c., on a very large scale at Calgary, Alberta.

The British Canadian Power Company, Cobalt, Ont., is adding largely to its plant.

A company with $2,000,000 capital stock has been formed to manufacture brick. One plant is to be at Laprairie, and another at another point on the St. Lawrence River.

The Sylvester Mfg. Company at Lindsay, Ont., has been reorganized. Drills and cultivators are to be made.

The Campbell Lumber Company, Weymouth Bridge, N. S., is planning to rebuild its pulp and saw mill which were destroyed by fire January 23, entailing a loss of $50,000. The plans include permanent buildings of concrete and steel construction, equipped with the most modern machinery, with direct electric drive.

The Oliver Chilled Plow Works is asking for bids for a fireproof malleable and gray iron foundry building at its Hamilton, Ont., plant, to be 135 x 576 ft.

The South

LOUISVILLE, KY., February 21, 1911.

The improvement of roads is one of the liveliest questions in the South, Kentucky and Tennessee especially having aroused sentiment in favor of better highways through the formation of State organizations. One of the results of this has been the opening of many rock quarries and the purchase of rock crushing equipment in preparation for the heavy demand for road making material, which will undoubtedly be in evidence a little later on. Dealers in quarrying equipment of all kinds report sales remarkably stimulated on this account. Other lines of machinery are also in good demand.

The Seelbach Hotel Company of Louisville has announced plans for the construction of a 10-story addition on the present site of its power house, and a new power building will be erected. A good deal of additional equipment for it will be purchased. The cost of the entire improvements is $200,000.

The Frederick-Ruggles Mfg. Company, Louisville, has been incorporated, with a capital stock of $6000. Joseph M. Frederick will manage the company, which already has a small shop and will manufacture bottling machinery and beer fillers.

John Rommel has secured the agency for the Brush and Sampson automobiles and will erect a garage and automobile repair shop at Campbell street and Broadway. Equipment for this will be purchased later.

The Murray & Thomas Company, Maysville, Ky., has been incorporated, with a capital stock of $12,000, and will manufacture granite. John H. Murray, W. A. Whallen, W. Fred Thomas and J. N. Treager are the incorporators.

Dr. W. E. Grant, city health officer of Louisville, has recommended the establishment of a fertilizer plant as a means of disposing of the city garbage.

The Wheland Machine Works, Chattanooga, Tenn., has sold H. H. Hitt of Danville, Ala., equipment for a stave mill. Prospects in timber-working lines are reported by the company to be considerably improved.

The American Smoke Fuel Company, Louisville, has been incorporated, with $2000 capital stock, for the purpose of developing patents on smoke consuming machinery. A. D. Jones, Frank Dunn and C. B. Jones are the incorporators.

Baker & Roberts are equipping a plant at Sparta, Tenn., for the manufacture of spokes and shuttles. Additional machinery will be secured. The firm proposes to utilize timber which is unsalable in any other way.

The Southern Cut Stone Company, Nashville, Tenn., has been incorporated, with $50,000 capital stock. T. L. Herbert, R. T. Creighton, Robert Elliott, Joseph M. Warren and D. Y. Johnson are the incorporators.

W. L. Regen of Lewisburg, Tenn., has purchased the equipment of the Lynnville Machine Shops, Lynnville, Tenn., and will move it to Lewisburg. He was formerly proprietor of the business.

Ranking & Echola, Dewitt, Ark., are installing a 10-ton refrigerating plant.

The John P. Dale Machinery Company has established quarters at 127 Third avenue south, Nashville, Tenn. It deals in power equipment and woodworking machinery.

N. E. Pitre of Boyle, Miss., will purchase an electric power plant of limited capacity.

C. H. Ruggles of Tuscaloosa, Ala., is inquiring for prices on a 2-hp. and a 7½-hp., three-phase motor.

J. T. Pullen of Laurel, Miss., is purchasing equipment for the operation of a water-gas plant. A franchise has just been awarded to him and others.

An 80-hp. boiler is one of the improvements to be installed in the plant of the Thomaston Ice Company, Thomaston, Ga.

The Coal Creek Electric Light Company, Coal Creek, Tenn., has announced plans for the erection of an ice plant and laundry.

Modern machinery is displacing the faithful mule in levee work in the South. Roach & Stansell, Memphis, Tenn., who have been awarded a contract for the construction of a loop levee near Greenville, Miss., are spending $50,000 in a plant to handle the job. The equipment will consist of a 90-ton steam shovel of the Bucyrus type, two standard-gauge locomotives, 30 standard-gauge dump cars and an automatic dirt spreader. An electric power plant operated by the steam shovel will keep the dirt spreader at work.

The Urwick Machinery & Supply Company, Louisville, is showing a new bilge pump, driven by a gasoline engine, manufactured by the C. H. & E. Mfg. Company, Milwaukee. It is attracting attention in contract work where trenches must be emptied.

The property of the Knoxville Woolen Mills will be offered for sale March 1 and 2 at Knoxville, Tenn. The holdings consist of four buildings and a large amount of machinery. Boilers, steam engines, electric generators and motors and woolen machinery are included. The equipment will be disposed of in lots.

A movement has been set on foot at Memphis, Tenn., to exempt new industries from taxation for five years.

Two hoisting engines will be purchased as part of the equipment of marine ways which are under construction at Knoxville, Tenn., by Oliver King. The expenditure involved is $15,000.

The Chesapeake & Ohio Railroad will construct a turntable at Maysville, Ky., at a cost of $10,000. F. I. Cabell, chief engineer of the company, with offices at Richmond, Va., is in charge of the work.

A bill has been introduced in the Tennessee Legislature providing for an issue of $1,250,000 of bonds by Chattanooga for the purpose of constructing a water works system. This includes an issue of $900,000 provided for some time ago. A Water Works League has been formed in Chattanooga and is urging the purchase of the present plant or the construction of a new one.

Dyersburg, Tenn., is outlining plans for a water works plant to cost $20,000. R. C. Houston, Memphis, Tenn., is drawing plans.

Brick and tile machinery, as well as a 30-hp. engine, are wanted by the Nabring Brick & Tile Company of Tullahoma, Tenn.

New machinery is to be installed in the plant of the Park Woolen Mills at Chattanooga, Tenn., after which operations will be resumed, following a period of idleness.

Improvements which will be made in the Boone County Flour Mills at Petersburg, Ky., include the installation of a 25-hp. gasoline engine.

Plans are being made for the establishment of an electric light plant at Big Sandy, Tenn.

The plant of the Chattanooga Stove Company, Chattanooga, has been purchased by the Wetter Mfg. Company, South Pittsburg, Tenn., which will have its headquarters in Chattanooga hereafter. One of the improvements will be the installation of machinery for the manufacture of a gas stove. Charles Huntington is president of the Wetter Company. The Chattanooga Stove Company has been controlled by Cleveland manufacturers.

The Home Light Company, Grayson, Ky., will largely

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increase the capacity of its plant, and additional generating equipment will be installed. An 80-hp. boiler will be purchased.

An electric plant will be added to the property of the Hickman Ice & Coal Company of Hickman, Ky. A 150-kw., alternating current, 60-cycle generator is to be secured.

Sargent & Lundy of Chicago, consulting engineers for the Kentucky Electric Company of Louisville, have been conferring here with Chief Engineer Lewis Streng of that company. Details concerning the new power plant of the company, which will cost over $500,000, will be determined this week.

A gasoline engine will be purchased by the County Board of Education at Memphis, Tenn. It will be used in connection with the heating plant of a high school.

The property of the Somerset Water, Light & Traction Company, Somerset, Ky., was recently sold at auction to end a receivership. J. H. Gibson, who purchased it, has organized the Union Water, Light & Traction Company, with a capital stock of $100,000. About $50,000 will be spent on improvements, and additional equipment for the lighting plant will be secured.

It is reported that the Odee Gas Engine Company, Beloit, Wis., will move its plant to Memphis, Tenn. The concern, it is stated, will be reorganized and its capital stock increased.

Coal developments in eastern Kentucky and adjoining territory promise to take a large volume of machinery. The Clinchfield Coal Corporation is reported to have plans for the construction of a $500,000 electric power plant and a $100,000 water plant. The Wisconsin Steel Company is pushing work on its coking ovens in that section.

Trenton, Tenn., has secured authority from the Legislature to issue bonds for the construction of a water works system.

Newport, Tenn., will build a water works plant to cost $50,000 if a bond issue to be voted on shortly is approved.

The Kimberly Coal Company, Trenton, Ky., is to purchase mining machinery for the development of 220 acres of coal lands. S. Y. Trimble, Hopkinsville, Ky., is president of the company.

The Elkhorn Consolidated Coal & Coke Company has been purchased by J. L. Rogers of Greenville, Ky., and others, and the development of 2500 acres of coal land is contemplated. An electric power plant to operate 300 coke ovens will be constructed. Work is planned to begin March 15.

The Union Light, Heat & Power Company of Covington, Ky., has secured a 20-year franchise to serve Dayton, Ky.

The City Council of Dayton, Tenn., is considering an issue of $25,000 in bonds for the purpose of establishing a municipal water works system.

The city of Waverly, Va., has voted to issue $7000 in bonds for the construction of an electric light plant.

The city of Portsmouth, Va., has voted to issue $600,000 in bonds for the purpose of establishing a system of water works.

The city of Richmond, Va., will install two centrifugal electric pumps, with a capacity of 4,000,000 gal., in Byrd Park, at an estimated cost of $12,000. Charles E. Bolling is city engineer.

The Mayor and Council of Rockmart, Ga., will receive bids until March 7 for the machinery, material and construction of a water works and sewerage system, for which $35,000 in bonds have been voted. The J. B. McClary Company, Empire Building, Atlanta, Ga., are the engineers in charge.

Dyer, Tenn., contemplates the issuance of bonds for a water works system and will construct a $1000 reservoir, brick engine house to cost $2000 and a 40,000-gal. tower and tank. The estimated cost of the machinery to be installed is $20,000. R. C. Houston, Central Bank Building, Memphis, Tenn., is preparing the plans.

A fire in the warehouse of the Huntsville Foundry & Machine Works, Huntsville, Ala., February 10, destroyed property valued at $3500.

Milwaukee and the Northwest

The George H. Smith Steel Casting Company, Milwaukee, Wis., is figuring on extensive improvements to its plant, details of which have not been completed.

The proposition of issuing $30,000 in bonds for the purchase of a water plant will be voted on at the spring election by citizens of Fon du Lac, Wis.,

The Duluth-Superior Traction Company, Superior, Wis., is planning an expenditure of about $400,000 in improvements on its systems in Duluth and Superior.

The Hartmann's Machinery Exchange, Green Bay, Wis., has let contracts for the construction of a new boiler shop, 80 x 80 ft., and a machine shop, 60 x 60 ft., of fire-proof construction. The boiler shop will be equipped with a 25-ton electric crane and a five-ton hand crane. The machine shop will also be equipped with a five-ton electric crane. One end of the building will be of temporary construction, permitting of future extension. A large steam hammer will be installed for heavy forging work, and shop and boiler tools will also be purchased.

C. S. Johnson & Son, Racine, Wis., have just completed a new three-story brick building, which will be used for office and warehouse purposes.

The Racine Mfg. Company, Racine, Wis., is contemplating the erection of a building, 100 x 280 ft., four stories, mill construction, to be equipped with automatic sprinklers throughout. The company advises, however, that it is considering the removal of its plant to a city just outside of Chicago. In this event, new buildings will be erected with a floor space aggregating 450,000 to 500,000 sq. ft. These buildings will also be of mill construction and fully equipped with automatic sprinklers.

The Oak Creek Town, Land & Mining Company, Oak Creek, Colo., has received a franchise for the construction of a water works system for which about $30,000 will be expended.

The White Iron Lake Iron & Water Power Company, Ely, Minn., is planning the construction of a power dam 12 ft. high at the outlet of White Iron Lake, to develop 25,000 hp.

The City Engineer of Fargo, N. D., is preparing plans for a filtration plant and pumping station. It is also proposed to have an electric light plant included in the plans.

A vote will be taken at Lewiston, Mont., on issuing $90,000 to $100,000 in bonds for the reconstruction of the water works system.

The City Council of Hankinson, N. D., is considering the installation of an electric light plant.

The Northern Welding & Mfg. Company, Minneapolis, Minn., whose plant was entirely destroyed by fire on January 14, has purchased a site and now has under construction a new machine shop, 44 x 176 ft., two stories. Several lathes and other metal working machinery and a large Davis-Bournonville oxy-acetylene welding apparatus are being installed. It is understood that other buildings will be erected at a later date.

Farther Central West

The Omaha Heavy Hardware Company, Omaha, Neb., has purchased a building adjoining its warehouse, which it will use for light manufacturing purposes.

A vote will be taken at Afton, Iowa, at the coming election on the installation of an electric lighting system.

The City Council of Belle Plaine, Iowa, is planning improvements to the water works system at an expenditure of $5000.

B. F. Lichty & Sons, Waterloo, Iowa, have filed articles of incorporation, with $12,000 authorized capital stock. The company is engaged in the sheet metal business, and will soon move to larger quarters. Hand power machinery will be used for the present and some new equipment will be purchased.

The Cement Tile Machinery Company, Waterloo, Iowa, incorporated for the past five years with $50,000 capital stock, has made amendments to its articles of incorporation, authorizing an increase of $75,000. Extensive improvements are under consideration by the company.

The Miller-Manney Cement Products Company, Marshalltown, Iowa, has established a factory for the manufacture of cement building blocks, posts, &c. In addition to the equipment already installed the company will purchase a block machine, post molds and novelty molds and steam plant for heating and curing.

The Walls Frogless Switch & Mfg. Company, Pueblo, Colo., has filed articles of incorporation with $1,000,000 capital stock. It is the purpose of the company to equip a plant in Pueblo where it will manufacture a frogless switch invented by J. W. Walls. It has not been decided, however, whether new buildings will be erected, or whether the company will occupy a building which has been offered.

The shoe factory of Bentley & Olmsted, Des Moines, Iowa, will temporarily be located at 224-226 Second street. It is probable that the firm will build a new factory on the site of the structure that was burned.

The citizens of Diagonal, Iowa, are desirous of entering into negotiations with parties that will establish a canning factory in their town.

W. H. Smola and J. T. Robinson of Central City, Iowa, have formed a copartnership and will engage in the manufacture of cement blocks, bricks and tile. The work of erecting a temporary factory will begin at once and machinery will be ordered. A large block-making machine has been bought.

The trustees of the water works at Ottumwa, Iowa, have

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let contracts for $60,000 worth of improvements to be made to the municipal plant. The installation of a filtering system at a cost of $38,240 and the extension of old water mains and a supply of new mains amounting to $22,000 comprise the improvements to be made.

The gas plant at Perry, Iowa, was wrecked February 8 by an explosion which blew out three of the walls of the building.

The Alfalfa Meal Company, Omaha, Neb., is taking steps looking to the building of a new mill to replace the one destroyed by fire January 9. J. T. Brooks is the general manager of the company.

Texas

AUSTIN, TEXAS, February 18, 1911.

Favorable reports of trade conditions in Texas, the Southwest and Mexico continue to be received from various points. It is stated that the small significance of the alleged revolutionary movement in Mexico is beginning to be realized by United States investors and others who are interested in the industrial development of that country and that projects which have been delayed on account of the disturbances in a small and remote part of the country will now be carried out. The influx of home-seekers into the Rio Grande valley and South Texas generally has broken all previous records during the last few weeks. The opening of ranch lands and the enlargement of farms already established are causing a constant increase in the demand for irrigation machinery.

At a recent meeting of the board of directors of the Marshall & East Texas Railroad Company a bond issue of $5,000,000 was authorized. It is stated that the proceeds from the sale of these bonds will be used to make improvements to the physical condition of the property. New machinery will be installed in the shops and a general work of betterments carried out.

At the Waco election, February 14, the taxpayers voted to issue $250,000 of bonds for the erection of a municipal electric light and power plant. The plans for installing the new plant will be prepared immediately, and the construction work started as soon as the bonds can be issued and sold.

The Board of County Commissioners of Dallam County are considering the erection of several steel bridges. Steel vaults and cages will also be installed in the county jail. The county seat is Dalhart.

The Chicago, Weatherford & Brazos Valley Railroad Company has let the contract for the erection of all bridges and depot buildings on its proposed line in Texas to J. W. Yarborough, Temple, Texas.

The Municipal Commission of Dallas has adopted an ordinance granting the Texas Company the right to extend its gas distributing service in that city. The new pipe lines will cover a number of streets.

Announcement is made by the Gulf, Colorado & Santa Fe Railroad that it has appropriated $60,000 for the enlargement of its shops at Cleburne, Texas. The general offices are at Galveston.

The Texas City Fruit and Produce Growers' Association of Texas City, Texas, contemplates installing a large fruit and vegetable canning factory at that place. W. H. Newby is president.

The Cleburne Sewerage Company will make important extensions to its sewer system in Cleburne, Texas. The City Council of that place is also considering the matter of ordering an election to construct a sewer system in the western part of the town.

At a recent joint meeting of the directors of the San Antonio Gas & Electric and the San Antonio Traction Companies, both of which are owned by the same interests, held in San Antonio a budget of $250,000 for proposed improvements to the plants and systems of the companies was adopted. It is stated that the electric lighting department will be improved at a cost of $50,000, exclusive of the reconstruction and remodeling of the power plant at an additional cost of $35,000. Additional boilers and machinery will be installed in the gas plant and other improvements made to that department at a cost of $58,000. Nearly $100,000 will be expended in double tracking lines of the San Antonio Traction Company. About $50,000 will be expended for additional trolley cars.

W. M. Baugh will construct a dam across Jin Ned bayou, near Brownwood, Texas, and install an irrigation pumping plant.

The City Council of Victoria, Texas, will make large extensions of the local water works distributing system.

New pumps are being installed at the water works plant of the city of Brenham, Texas. Other improvements to the system will be made.

The Lockhart Water Works & Power Company is installing a new ice manufacturing plant at Lockhart, Texas. The company will also install new motors and other equipment in the power plant.

The Flatonia Ice, Water & Electric Light Company has received its engine and other machinery for its new plant. It will provide electric lights for the town of Flatonia, Texas.

T. J. Majors, J. A. Owen, W. C. Hunt of Alvin, Texas; L. H. Wallis of Houston and H. P. Rhodes of Cuero, Texas, have formed a company to build an ice factory and cold storage plant at Alvin, to cost about $15,000.

The saw mill formerly owned by S. G. Regney, and which was in the hands of the Texas Banking & Investment Company of Beaumont, and situated near Silsbee, Texas, has been purchased by J. C. Appleman of Pitkin, La. He will overhaul the plant, install new machinery and again place it in operation.

The Fort Worth Wagon Company was recently organized ized at Fort Worth with a capital stock of $150,000. The incorporators are Warren Heaton, C. Hightower and John F. Shelton.

The Lee County Cotton Oil Company, Giddings, Texas, has been organized for the purpose of establishing a cotton seed oil mill. The company has a capital stock of $40,000. The incorporators are P. S. Grogan, J. S. Hillsman and Richard W. Mayfield.

I. Friedman is installing the machinery for his new broom factory at Rock Island, Texas.

The Mission Ice & Fuel Company, San Antonio, Texas, will build a new 25-ton ice plant in that city, in addition to its present plant. The company recently brought in an artesian well of large capacity.

The Gulf, Colorado & Santa Fe Railroad Company will install new machine shops at Somerville, Texas. It is also enlarging its roundhouse at that place.

J. A. Logwood of San Antonio, Texas, and associates have sold their interurban electric railway that they were constructing between San Antonio and San Jose to A. D. Powers, and the latter will complete the line.

The Tyler Turpentine Company is installing a turpentine still and other equipment near Colmesneil, Texas. S. S. Day is general manager.

The St. Louis, Brownsville & Mexico Railroad will establish extensive terminals at Harlingen, Texas, a large tract of land having been purchased recently for the purpose. The opening of the new railroad route into Mexico will make Harlingen an important division point, it is stated.

The Water Works Commission of Temple, Texas, has awarded the contract for the construction of a filtering plant to cost about $30,000.

W. Prout, Jr., of Denver, Colo., and associates, will erect a large factory for the manufacture of macaroni at El Paso, if a favorable site for the proposed industry is obtained.

The San Marcos Utilities Company has been granted a renewal of its electric light franchise by the City Council of San Marcos, Texas, and the company announces that it will spend at least $10,000 in increasing its equipment in order to meet the demand for an enlargement of its service. It will give a 24-hour service and make provisions for furnishing power for all purposes.

The City Council of Georgetown, Texas, has let the contract for improvements to the municipal water and light plant to cost about $35,000. The water works distributing system will be greatly enlarged, new dynamos installed and other improvements made.

The City Council of Farmington, N. M., has under consideration the proposition of submitting to a vote of the people a bond issue for installing a water works pumping plant and distributing system and a municipal electric light plant. It is stated that the water works proposition will be put through, irrespective of what decision is reached as to the proposed lighting plant. In this connection it is announced that the Rockwood Power Company, which has a large electric power plant at Durango, contemplates running a transmission line down the Animas River Valley to Farmington to furnish power for the irrigation pumps of the farmers and power and lights for the towns of Aztec, Flora, Vista, Kirtland, Fruitland and Farmington. A local company is also being organized to install an electric light and power plant.

The Mexico Mines Company, Ltd., will erect a large reduction plant at its mines in the Guanajuanto, Mexico, district. Dr. J. L. Hill is president and W. H. Ehlert managing director.

The Compania Minera Bicolas Bravo of Almoloya, State of Chihuahua, Mexico, will install considerable new machinery at its mines.

The Taxco Mines of Mexico, Ltd., will erect a 100-ton

THE MACHINERY MARKETS

reduction mill at its mines at Taxco, State of Guerrero, Mexico.

Overmuller & Wilson of Sobia, State of Sonora, Mexico, will install a 10-stamp mill at their mine at that place.

Carlos von Brandis of Durango, Mexico, will erect a concentrating and cyaniding plant at Avino, State of Durango, Mexico. The Lucia Mining Company of Avino is also interested in the proposed plant.

Dr. Howard A. Kelly of Baltimore, Md., and J. E. McCreary of Oaxaca, Mexico, will erect a custom ore reduction mill at Oaxaca.

A mill will be installed at the Carmon mine at Guanajuato, Mexico, by a French syndicate that owns the property. Ernesto Brunel is manager.

The San Cayetano Mines Company will install a large ore reduction mill at San Cayetano, State of Guanajuato, Mexico.

The Compania Minera de Natividad y Anexas will install a hydroelectric plant of 1000 hp. at its mines near Sierra Juarez, State of Oaxaca, Mexico.

The San Antonio Gas & Electric Company, San Antonio, Texas, has under consideration extensive improvements to its plants during the coming year.

A committee of business men of Wichita Falls, Texas, composed of N. Henderson and others, is conferring with the owners of an engine and boiler works plant at Corinth, Miss., for the removal of the plant to Wichita Falls. A committee representing the company will visit Wichita Falls some time this month for investigation purposes.

The Wichita Falls Foundry & Machine Company, Wichita Falls, Texas, is installing a cupola of eight tons capacity which will increase its capacity to 11 tons per day. The company has also installed a bolt cutter and a 4-in. pipe cutting machine and expects to install an 8-in. pipe cutting machine in the near future.

Ground will be broken at Port Houston, Texas, a suburb of Houston, within a few weeks for the erection of a factory for the manufacture of brass and iron beds. A company has been organized with $200,000 capital stock, all of which is paid in. Formal organization and election of officers will take place shortly, but as the promoters are at present located in another city they have requested their names to be withheld. An entire new equipment of machinery will be installed in the factory when completed. The matter is at present in charge of the Houston Chamber of Commerce.

The city of Hearne, Texas, is making preparations for the installing of its new water works system, for which bonds were voted.

Pacific Coast

SAN FRANCISCO, CAL., February 15, 1911.

Metal working tools have received a little more attention from local purchasers since the first of the month, though no large amount of heavy machinery has been sold. Practically all local purchases have been for the replacement of old tools. Many of the shops are now fairly busy, but few are working at capacity. Several plans are under consideration, however, for increased facilities, and there is little doubt that more tools will be installed than last year. There is some talk of new railroad shops and other installations of a large nature, but this has not yet taken the shape of definite inquiries. Business through the country has been interfered with by violent storms, but is rapidly getting back to normal.

Orders are now beginning to result from tentative inquiries for heavy machinery of a miscellaneous nature which have been in the market for some time, though there is hardly as much demand for contractors' equipment as was expected, in view of the amount of improvement work planned for this year. The California saw mill and logging interests are placing a few scattered orders, and several local planing mills are coming into the market, but no great activity is expected before the end of the rainy season. Rock crushing equipment is quiet, but several new projects of some importance are being started. A heavy snowfall has delayed business with the northern California mines, which are likely to hold off until the middle tof April, but a great deal of new development is scheduled, and conditions are favorable for an unusually active season. There is an increasing demand for water works machinery and irrigating pumps.

W. S. Heger, California manager for the Allis-Chalmers Company, has returned from a trip to Milwaukee.

The United Engineering Works is figuring on the installation of several new machine tools.

The George E. Dow Pumping Engine Company has added a new furnace to its foundry department.

The Natomas Consolidated of California, operating in the Oroville district, has purchased a large locomotive crane.

The Noble Electric Steel Company is installing several large transformers in connection with its four new furnaces at Heroult, Cal.

Head & Goodman are preparing to install a small machine shop at Chico, Cal.

Matheson Brothers, operating a mining property at Seward, Alaska, intend to put on a steam shovel at a cost of about $15,000 this season.

Los Angeles parties have placed an order with the George E. Dow Pumping Engine Company for a large two-stage air compressor for an air lift in waterworks service. It will be steam driven, of the cross-compound condensing type. This company is also building a complete plant with a capacity of 300 gal. per minute, to pump from a number of wells 600 ft deep, to an elevation of over 800 ft., by means of an air lift. The outfit includes boilers, cross-compound surface condensing engines, a two-stage air compressor and all auxiliary machinery.

The Glendora, Cal., Irrigating Company will install a large deep-well pump in the San Dimas wash.

The Hanford, Cal., Water Company is preparing to put in a lot of new pumping machinery.

Placer mining interests of California and Alaska, who have been figuring for some time on gold dredging outfits to be built this year, are beginning to place their orders. The Moore & Scott Iron Works of this city, has taken a contract for steel hulls for two dredges for Alaska, in which about 500 tons of material will be used.

The Union Iron Works has been unusually busy on marine work of late. The rebuilding of the steel steamer Damara has just been completed, and several other steamers are undergoing extensive repairs.

The Zenith Iron Works has been incorporated in San Francisco with a capital stock of $20,000 by John Clark, J. A. Campbell, W. J. and H. F. Duthie.

Frank P. Clark, representing C. C. Moore & Co. at Honolulu, is taking orders for a large number of oil-burning outfits. This company has just taken a contract for installing piping and machinery in the plant of the Southern California Edison Company at Long Beach.

The city of Alameda, Cal., will receive bids Feb. 27 for a water tube boiler, stack and piping for the municipal electric light plant.

The Warman Steel Casting Company, recently incorporated at Los Angeles, has signed an agreement to erect a plant with three furnaces at Redondo, Cal.

The Gorham Engineering Works of Alameda, Cal., manufacturing gas engines, &c., has let a contract for a new building, and a lot of new equipment will be installed. The company recently purchased a lot 150 x 280 ft., fronting on the tidal canal. Orders have been placed for part of the machinery.

The Indiana Machine Shop Company, Oroville, Cal., is in the market for a set of plate bending rolls for plates 1½ in. thick and 7 ft. wide.

The California Materials Company is preparing to install a large conveyor system to handle sand at its plant near Niles, Cal.

Plans are being completed for a large addition to the general repair shops of the Southern Pacific Railroad at Los Angeles.

Arrangements are being made for replacing the acid plant of the Standard Oil Company at Richmond, Cal., which was destroyed by fire a few days ago.

The Pacific Lumber Company is replacing a lot of the machinery in its old mill near Eureka, Cal., putting in modern log-handling equipment, &c.

Bids will be opened March 1 for installing pumping machinery at the United States Army general hospital at the San Francisco Presidio.

The Development & Securities Company, C. R. Collins of Long Beach manager, is preparing to erect a plant at San Bernardino, Cal., for the manufacture of concrete products. A large rock crushing outfit will also be installed.

The San Diego, Cal., Stone Company is considering the addition of a No. 6 crusher and a complete pneumatic drilling plant at its Sweetwater quarry.

H. B. Babington, president of the Prince Rupert, B. C., Iron Works, was a recent visitor to San Francisco.

It is announced that the Bradrick Power Pump Company will move its shops from Porterville, Cal., to Los Angeles.

The Nevada City, Cal., Miners' Foundry has taken a contract for a 20-stamp ore mill for the Union Hill mine.

The Maricopa Company is preparing to install a lot of mining machinery on its property near Goldfield, Nev. The equipment will include three boilers, a 200-hp. Corliss engine, a steam air compressor and a small electric generator.

The Southern Pacific interests, which now control the electric railway system of Los Angeles, are planning a large amount of tunnel and subway work, on which they are expected to start operations this year.

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The Southwest Sugar Company is planning to install a beet sugar mill at Perris, Cal.

The town of Colton, Cal., is taking bids on a lot of machinery, including air compressors, motors and transformers.

The Kingsley Chemical Reduction Company, Spokane, Wash., has let contracts for the construction of a new plant, work upon which will be commenced as soon as the frost is out of the ground.

The Tacoma Foundry & Machine Company, Tacoma, Wash., recently incorporated, has purchased 2½ acres of ground upon which it will immediately start the erection of a large foundry. Those interested in the company are Wilson Webb, John Taylor and T. B. Hall.

The Portland Railway, Light & Power Company, Portland, Ore., is preparing plans for the erection of new repair shops at a cost of $300,000 to be erected on a tract of 15 acres recently acquired. It is the intention of the company to consolidate all of its present repair shops into the new building, but eventually an adjoining plant will be erected in which the company will build its rolling stock. The building will be of fireproof construction throughout and will be equipped with modern machinery. There will also be a number of other buildings erected, including a blacksmith shop, paint shop, woodworking shop, foundry, machine shop and general repair and reconstruction plant. The company's plans provide for buildings that will cover the entire 15 acres within the next few years.

The California Power & Mfg. Company has filed articles of incorporation at San Francisco, Cal., with $5,000,000 capital stock. The company proposes to own and operate water plants for power, lighting, irrigation, electricity and heating. F. G. Blaum and Charles W. Slack are two of the directors named in the articles of incorporation.

The Pacific Gas & Electric Company, San Francisco, Cal. is contemplating extensive improvements, including the erection in the vicinity of Sacramento of a large auxiliary power plant to be operated by steam. A site for the plant is now being selected.

The Constructing Quartermaster, Fort Mason, Cal., is asking for bids to be opened March 1 for constructing addition to power house and installing pumping machinery at the United States army general hospital, Presidio, San Francisco, Cal.

The Rogue River Electric Company, Medford, Ore., has begun preliminary work on a hydroelectric power plant which will be equipped with one 5000-hp. unit this season, and other units later on.

The Live Oak & Eucinal Light & Power Company, Live Oak, Cal., has been purchased by Berg & Metz of that city, who will make extensive improvements.

Vancouver, Wash., will expend about $50,000 for the construction of a municipal water works system.

The City Council of Elma, Wash., will employ an engineer to prepare estimates for a water works system.

Government Purchases

WASHINGTON, D. C., February 20, 1911.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids March 21, under schedule 3355, for two turbo-generating sets for the Navy Yard, Mare Island, Cal.

The Isthmian Canal Commission, circular 522 A, calls for bids to be opened March 6, for furnishing hoisting chain, wire rope, stranded wire and water tapping machine.

The Department of the Interior, United States Reclamation Service, Washington, will open bids March 10 for furnishing turbine water wheels for the Salt River project, Arizona.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids February 14, as follows:

Class 11.—One 2-ton side blow converter—Bidder 20, Colne & Co., New York, $2950; 70, Tropenas Converter Company, New York, $3200; 79, Bradley, Stoughton, New York, $2200.

Class 21.—One set of gasoline machinery—Bidder 12, Bruns, Kimball & Co., New York, $3797.35; 18, Clifton Water Works, Cincinnati, Ohio, $5045; 34, Gas Engine & Power Company and Charles L. Seabury & Co., Morris Heights, N. Y., $6000; 48, Murray Tregutha Company, South Boston, Mass., $4480.80; 54, New York Yacht & Engine Company, Morris Heights, N. Y., $5300.

Class 22.—One Mosher marine water tube boiler—Bidder 4, Almy Water Tube Boiler Company, Providence, R. I., $2170; 34, Gas Engine & Power Company and Charles L. Seabury & Co., Morris Heights, N. Y., $2350; 35, Griscom Spencer Company, New York, $2197; 45, Mosher Water Tube Boiler Company, New York, $3300; 75, Charles Ward Engine Works, Charleston, W. Va., $2750 and $2500.

The Isthmian Canal Commission, Washington, opened bids February 10, under Canal circular 618, for one crane, as follows: Manning, Maxwell & Moore, New York, Shaw crane, $5752; Niles-Bement-Pond Company, New York, $6100; Whiting Foundry Equipment Company, Harvey, Ill., $5445.

Bids were opened February 14 by the Superintendent of Prisons, Washington, for furnishing electric light and power installation at the United States Penitentiary, Atlanta, Ga., as follows: McCay Engineering Company, Baltimore, Md., $5635; International Electric Fixture & Contracting Company, St. Louis, Mo., $4300; Tholen Brothers, Leavenworth, Kan., $5205; William H. Neville, Leavenworth, Kan., $2839 and $2239; Whitall Electric Company, Westerley, R. I., $5380; National Electrical Supply Company, Washington, D. C., $4800.

The Collin By-Product Coke Oven

In an unusually well printed and illustrated pamphlet the Coal Distillation Company, 1211 Singer Building, New York, gives an account of the development of the Collin by-product coke oven which was described in *The Iron Age* of August 4, 1910, page 272. By detailed description and the use of illustrations with reference letters the pamphlet brings out the features of the Collin regenerative oven and shows the advantages secured by this type. Its distinguishing principle is that all heating flues are at all times directly heated by live gas instead of by the alternation of live gas and waste heat, as is ordinarily the case with regenerative ovens, and all heating flues of the oven are always under the same draft. Emphasis is put on the large supply of gas produced by the Collin oven and on the building of the regenerative chambers independent of the oven structure. A list is given of 86 European plants employing the Collin oven. The oven is also built without regenerators, this being cheaper and simpler in construction and working. It is recommended for small plants, where there are either existing boilers or existing steam engines which are to use the surplus steam, and where simplicity in working is required owing to the difficulty of getting skilled labor and superintendence. Where gas of a high grade is desired it is stated that the increased yield of gas will much more than compensate for the extra cost of the regenerative oven. The pamphlet is well illustrated with views of European plants.

The Empire Iron & Steel Company, Niles, Ohio, in order to satisfactorily handle the increased demand for its products through the Middle West, has established branch warehouses in Chicago, at 22 Lake street. Customers through that section will doubtless be pleased to learn of this addition to the company's well regulated distributing facilities. All orders received by the Chicago branch from its territory will receive the same prompt attention as that accorded by the home office, plus added advantage in shipment. The company's products comprise black and galvanized sheets, all forms of metal roofing and siding, eaves trough and conductor pipe, metal shingles, ornamental metal ceilings and sidewalls.

The Taylor & Boggis Foundry Company, Cleveland, has purchased a large building site from the Standard Oil Company on East Fifty-fifth street and the Erie Railroad, on which it will begin the erection of a plant early in the spring to replace its No. 2 plant. The latter plant has been sold to the Pennsylvania Railroad, which wanted the site for a freight depot. The new plant will include a foundry, machine shop and the builders' hardware manufacturing department. The company has acquired a site of sufficient size to provide a location for its No. 1 foundry plant should it be decided later to abandon the present site of that plant and rebuild.

The stockholders of the National Screw & Tack Company, Cleveland, will vote February 25 on increasing the common stock from $1,000,000 to $1,250,000. A stock dividend representing earnings expended on the property has been discussed. A vote will also be taken February 25 by the stockholders of the National-Acme Mfg. Company, Cleveland, on an increase in capital stock from $1,500,000 to $2,500,000.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market repo

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1⅜ in. round and square	₩ lb 1.75¢
1½ to 4 in. x ⅜ to 1 in.	
1½ to 4 in. x ¼ to 5-1	₩ lb 1.85¢
Rods—⅜ and 11-16 round and square	₩ lb 1.85¢

Angles:	Cts ₩ lb
3 in. x ¼ in. and larger	2.00¢
3 in. x 3-16 in. and ⅛ in.	2.25¢
1½ to 2½ in. x ⅛ in.	2.10¢
1½ to 2¾ in. x 3-16 in. and thicker	2.00¢
1 to 1¾ in. x 3-16 in.	2.10¢
1 to 1¾ x ⅛ in.	2.30¢
⅞ x ⅛ in.	2.30¢
¾ x ⅛ in.	2.40¢
⅝ x ⅛ in.	2.45¢
½ x 3-32 in.	4.25¢

Tees:	
1 in.	2.65¢
1¼ in.	2.45¢
1½ to 2½ x ¼ in.	2.15¢
1½ to 2½ x 3-16 in.	2.25¢
3 in. and larger	2.05¢
Beams	2.00¢
Channels, 3 in. and larger	2.00¢
Bands—1½ to 6 x 3-16 to No. 8	2.30¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
Norway Bars	3.60¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	1.90¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black	One Pass, C.R Soft Steel.	R. G. Cleaned.
No. 16	₩ lb 2.55¢	2.80¢
Nos. 18 to 20	₩ lb 2.70¢	2.90¢
Nos. 22 and 24	₩ lb 2.75¢	3.00¢
No. 26	₩ lb 2.80¢	3.10¢
No. 28	₩ lb 2.95¢	3.30¢

Russia, Planished, &c.

Genuine Russia, according to assortment, ₩ lb 12 @14½

Patent Planished, W. Dewees Wood, ₩ lb A, 10¢; B, 9¢ net.

Galvanized.

Nos. 12 and 14	₩ lb 2.95¢
Nos. 22 to 24	₩ lb 3.30¢
No. 26	₩ lb 3.50¢
No. 28	₩ lb 3.80¢

No. 20 and lighter 36 inches wide, 25¢ higher

Genuine Iron Sheets—

Galvanized.

Nos. 22 and 24	₩ lb 5.75¢
No. 26	₩ lb 6.25¢
No. 28	₩ lb 7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd
No. 24 ₩ 100 sq. ft.	$3.85	4.80
No. 26 ₩ 100 sq. ft.	2.95	4.00
No. 28 ₩ 100 sq. ft.	2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:

IC, 14 x 20	$6.65
IX, 14 x 20	7.90

A. Charcoal:

IC, 14 x 20	$5.60
IX, 14 x 20	5.70

American Coke Plates—Bessemer—

IC, 14 x 20 ..107 lb	$4.50
IX, 14 x 20	5 50

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8 70
IX, 20 x 28 with an 8 lb. coating	10.70

Seamless Brass Tubes—

List November 12, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 21¢

Brazed Brass Tubes—

List August 1, 1908. 19¾¢ ₩ lb

High Brass Rods—

List August 1, 1908. 14¼¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 14¼¢ ₩ lb

Brass Wire—

List August 1, 1908. 14¼¢ ₩ lb

Copper Wire—

Base Price. Carload lots mill 13½¢

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 18 ¢

Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot.

Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.

Planished Copper, 1¢ ₩ square foot more than Polished.

METALS—

Tin—

Straits Pig ₩ lb 40@40

Copper—

Lake Ingot	₩ lb 14@15
Electrolytic	₩ lb 14@
Casting	₩ lb 14¼@

Spelter—

Western ₩ lb 5¼@

Zinc.

No. 9, base, casks ₩ lb 6 ¢ | Open ₩ lb 6@

Lead.

American Pig	₩ lb 5 @5
Bar	₩ lb 6@

Solder.

½ & ½, guaranteed	₩ lb 28 @3
No. 1	₩ lb 26 @3
Refined	₩ lb 24 @2

Prices of Solder indicated by private brand vary ac cording to composition.

Antimony—

Cookson	₩ lb @8
Hallett's	@8
Other Brands	@8

Bismuth—

Per lb $2.00@$2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingots for remelting @

Rods & Wire	Base Price 2
Sheets	Base Price 2

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 10.75@11.00
Copper, Heavy and Wire	₩ lb 10.50@10.75
Copper, Light and Bottoms	₩ lb 9.50@9.75
Brass, Heavy	₩ lb 7.00@7.25
Brass, Light	₩ lb 5.50@5.75
Heavy Machine Composition	₩ lb 9.25@9.50
Clean Brass Turnings	₩ lb 7.00@7.25
Composition Turnings	₩ lb 8.25@8.50
Lead, Heavy	₩ lb @3.75
Lead, Tea	₩ lb @3.50
Zinc Scrap	₩ lb @4.00

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We have had over forty years' experience in making Files and Rasps; we not only know what KIND of steel to use, but HOW to use it.

If NICHOLSON FILES did not hold their CUTTING edge—our order books would not hold so many CUSTOMERS.

We make over 3,000 different styles and sizes. Send for Catalog.

NICHOLSON FILE COMPANY

PROVIDENCE, R. I., U. S. A.